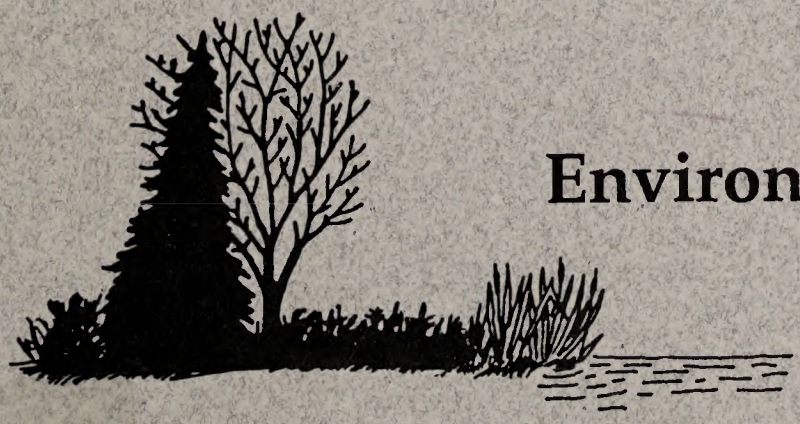
BLM LIBRARY
88072854

VEGETATION AND WETLANDS TECHNICAL REPORT

Union Pacific Resources Company
Greater Wamsutter Area II
Natural Gas Development Project



ECOTONE
Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516
LOGAN, UTAH 84321
BUS 801/752-2204 FAX 801/752-0733

TD
195
.G3
D723
1995c



BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225

#984694592 ID: 88072854

TD
195
.G3
D723
1995c

VEGETATION AND WETLANDS TECHNICAL REPORT

Union Pacific Resources Company
Greater Wamsutter Area II
Natural Gas Development Project

Prepared for

U.S. Department of the Interior
Bureau of Land Management
Rawlins District Office
Great Divide Resource Area
812 East Murray
Rawlins, Wyoming 82301-0670

and

Gary Holsan Environmental Planning
P.O. Box 175
Thayne, Wyoming 83127

Prepared by

Oliver John Grah
Juli Elayne Crane

ECOTONE Environmental Consulting, Inc.
P.O. Box 3516
Logan, Utah 84323-3516

December 1994
(Revised January 1995)

TABLE OF CONTENTS

		Page
EXECUTIVE SUMMARY		iv
1.0	INTRODUCTION	1
2.0	METHODS	1
2.1	UPLAND VEGETATION	4
2.2	WATERS OF THE U.S., INCLUDING WETLANDS AND OTHER SPECIAL AQUATIC SITES	5
2.3	PLANT SPECIES OF CONCERN, INCLUDING BLM SPECIAL STATUS PLANTS	6
2.4	CUMULATIVE IMPACTS	7
3.0	AFFECTED ENVIRONMENT	7
3.1	GENERAL VEGETATION	7
3.1.1	Cover Types	8
3.1.1.1	Mixed Desert Shrub	8
3.1.1.2	Barren Land/Cushion Plant	9
3.1.1.3	Urban Land	9
3.1.1.4	Disturbed Land	9
3.1.1.5	Wet Meadow	10
3.1.1.6	Marsh	10
3.1.1.7	Mudflat/Playa	10
3.1.1.8	Aquatic Bed	11
3.1.1.9	Open Water	11
3.1.1.10	Riverine	11
3.1.2	Weeds and Poisonous Plants	12
3.1.2.1	Weeds	12
3.1.2.2	Poisonous Plants	12
3.2	WATERS OF THE U.S., INCLUDING WETLANDS AND OTHER SPECIAL AQUATIC SITES	14
3.2.1	Definitions	14
3.2.2	Administrative Responsibility for and Regulation of Wetlands	15
3.2.3	Waters of the U.S. Cover Types	16
3.2.4	Jurisdictional Areas Subject to the Clean Water Act	16
3.2.4.1	Hydric Soils	18
3.2.4.2	Wetland Hydrology	18
3.2.4.3	Hydrophytic Vegetation	19
3.2.5	Wetland Functional Values	19
3.2.5.1	Groundwater Recharge	20
3.2.5.2	Groundwater Discharge	20
3.2.5.3	Flood Storage and Desynchronization	21
3.2.5.4	Shoreline Anchoring and Dissipation of Erosive Forces	21

TABLE OF CONTENTS, Continued

Page

3.2.5.5 Sediment Trapping 21
3.2.5.6 Nutrient Retention and Removal 22
3.2.5.7 Food Chain Support 22
3.2.5.8 Wildlife and Fish Habitat 22
3.2.5.9 Heritage and Recreation Values 23
3.3 EXTENT OF VEGETATION COVER TYPE COVERAGE 23
3.4 PLANT SPECIES OF CONCERN, INCLUDING BLM SPECIAL STATUS PLANTS 24
3.4.1 Diffuse Sagebrush 27
3.4.2 Broad-flowered Pincushion 28
3.4.3 Cedar Rim Thistle 28
3.4.4 Ownbey's Thistle 29
3.4.5 Wyoming Tansy Mustard 29
3.4.6 Large-fruited Bladderpod 29
3.4.7 Contracted Ricegrass 30
3.4.8 Stemless Beardtongue 31
3.4.9 Gibbens Penstemon 31
3.4.10 Tiny Phacelia 31
3.4.11 Opal Phlox 32
3.4.12 Green River Greenthread 32
3.4.13 Western Hop-sage 33

4.0 ENVIRONMENTAL CONSEQUENCES 33
4.1 INTRODUCTION 33
4.2 IMPACT SIGNIFICANCE CRITERIA 33
4.3 DIRECT AND INDIRECT IMPACTS 34
4.3.1 Proposed Action 34
4.3.2 Alternative A 37
4.3.3 Alternative B 38
4.3.4 Alternative C - No Action 38
4.4 IMPACTS SUMMARY 38
4.5 CUMULATIVE IMPACTS 40
4.6 MITIGATION SUMMARY 41
4.7 RESIDUAL IMPACTS 43

5.0 REFERENCES CITED 44

APPENDICES
Appendix A - Data Forms
APPENDIX A-1 - Detailed Vegetation/Soils Sample Point Data Forms
APPENDIX A-2 - Wetland Sample Point Data Forms

TABLE OF CONTENTS, Continued

Page

Appendix B - Species Lists
APPENDIX B-1 - General Species List by Cover Type
APPENDIX B-2 - Species List and Wetlands Indicator Status
Appendix C - Personal and Written Communications

LIST OF EXHIBITS

Exhibit 1. Area Map - Location of the GWA II Analysis Area in South-Central Wyoming 2
Exhibit 2. Vicinity Map - Geographic Features within the GWA II Analysis Area 3
Exhibit 3. National Wetlands Inventory Map of the GWA II Analysis Area 17

LIST OF TABLES

Table 1. Designated Noxious Weeds in Wyoming 13
Table 2. Classification of Waters of the United States within the Analysis Area 18
Table 3. Estimated Functional Values for Wetlands and Riparian Areas within the GWA II Analysis Area 20
Table 4. Plant Species of Concern (including BLM Special Status Plants) and Their Status and Habitat Characteristics 25

EXECUTIVE SUMMARY

Union Pacific Resources Company and other operators (the Operators) propose to drill additional gas development wells within the Greater Wamsutter Area located in Carbon and Sweetwater counties, Wyoming, on land managed by the Bureau of Land Management (BLM), Great Divide Resource Area. The Proposed Action and other alternatives are evaluated in the *Greater Wamsutter Area II (GWA II) Project Draft Environmental Impact Statement* (EIS) (USDI-BLM 1995).

Project implementation could affect vegetation resources, including vegetation cover types that provide important habitats to wildlife (pursuant to habitat management by the BLM); waters of the United States, including special aquatic sites such as jurisdictional wetlands (pursuant to the federal Clean Water Act); and plant species of concern, including individuals and/or habitat (pursuant to the federal Endangered Species Act and BLM rules and regulations). This technical report presents data characterizing the existing environment, including information on the 1) occurrence and character of vegetation cover types; 2) reconnaissance-level investigations on the occurrence, distribution, and character of waters of the U.S. including special aquatic sites and jurisdictional wetlands; and 3) plant species of concern, including BLM-designated special status plants. Information in this report supports and supplements the GWA II EIS (USDI-BLM 1995).

Vegetation cover types within the project area include mixed desert shrub, barren land/cushion plant, urban land, disturbed land, marsh, wet meadow (fresh and saline subirrigated), mudflat/playa, aquatic bed, open water, and riverine. The mixed desert shrub cover type dominates the 334,191-acre analysis area (approximately 254,430 acres). Other cover types occupy the following acreages: barren/cushion plant, 63,608 acres; urban land (including roads, railroad, residential and commercial buildings), 6,231 acres; disturbed land, 6,296 acres; wet meadow, 2,069 acres; marsh, 7 acres; mudflat/playa, 748 acres; open water and aquatic bed, 612 acres; and riverine, 190 acres.

Waters of the U.S. are subject to administrative jurisdiction by the Department of Army Corps of Engineers (COE) pursuant to Section 404 of the federal Clean Water Act (CWA) as well as other federal agencies pursuant to Executive Orders 11998 and 11990. Wetlands in particular play an important role in maintaining the quality of waters of the U.S. and in providing valuable aquatic and riparian habitat. Activities that involve discharge of dredge or fill material into waters of the U.S. require authorization from the COE through the Section 404 permit programs. The 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) was used to identify and delineate jurisdictional wetlands at a reconnaissance level.

A total of 54 sample points were utilized to determine the occurrence and distribution of special aquatic sites, including jurisdictional wetlands. Coverage by wet meadow, marsh, open water/aquatic bed, and mudflat/playa is not exact due to 1) the small mapping scale (i.e., 1:24,000) and 2) the high variability of environmental conditions that allow shifts from one type to another over the course of the growing season. The primary functional values of these wetlands include groundwater recharge and nutrient retention/removal. These areas offer

moderate values for groundwater discharge, flood storage and desynchronization, sediment trapping, food chain support, wildlife habitat, and heritage value.

Of the thirteen plant species of concern in the Great Divide Resource Area for this project (including 11 special status plants), three species are likely to occur within the analysis area: western hop-sage, contracted ricegrass, and Cedar Rim thistle. The latter two are BLM special status plants. Species that may possibly occur in the area are diffuse sagebrush, broad-flowered pincushion, large-fruited bladderpod, Gibben's penstemon, tiny phacelia, and Opal phlox. All but broad-flowered pincushion and tiny phacelia are BLM special status plants.

1.0 INTRODUCTION

Union Pacific Resources Company (UPRC), Amoco Production Company, (Amoco), and other Greater Wamsutter Area (GWA II) gas development field operators (referred to hereafter as "the Operators") have proposed to drill and develop 300 additional well locations (a total of 750 wells) in addition to the existing drilling and production operations within the GWA II analysis area (Exhibits 1 and 2). The proposal would provide for full development of the natural gas fields within the analysis area.

The environmental impact statement (EIS) prepared for this project (USDI-BLM 1995) addresses the Proposed Action and three separate alternatives, including No Action. The Proposed Action and two development alternatives would provide a range of development scenarios, from a maximum of 750 wells @ 300 locations (including related roads, pipelines, and production facilities) to a minimum development scenario of 225 wells @ 200 locations (including related activities and facilities).

This technical report has five objectives:

1) to summarize the methods used to obtain data on vegetation cover types, the occurrence and distribution of wetlands within the project area, and plant species of concern (including BLM special status plants);

2) to provide detailed descriptions of the affected environment, including vegetation cover types (e.g., upland cover types as well as wetlands and other special aquatic sites), weeds and poisonous plants, and plant species of concern within the project area;

3) to clearly define and describe the relationship between the terms *waters of the U.S.*, *special aquatic sites*, *wetlands*, and *jurisdictional wetlands*; and discuss wetland functional values for the analysis area;

4) to present the analysis of impacts to vegetation resources that would occur under each of the project alternatives, including no action; and

5) to present data forms for vegetation and wetland sampling.

2.0 METHODS

Existing information was used as a basis for describing plant cover types, poisonous plants and weeds, wetland and riparian areas, and plant species of concern. Data sources included existing EAs and EISs; Wyoming floras; National Wetlands Inventory (NWI) maps; sensitive plant field guides and status reports; unpublished agency reports and data; and personal communication with county, state, federal agency personnel (including the Sweetwater County Weed and Pest District, the Wyoming Natural Diversity Database [WYNDD], and the Fish and Wildlife Service [FWS]) and herbarium personnel (see Appendix C).

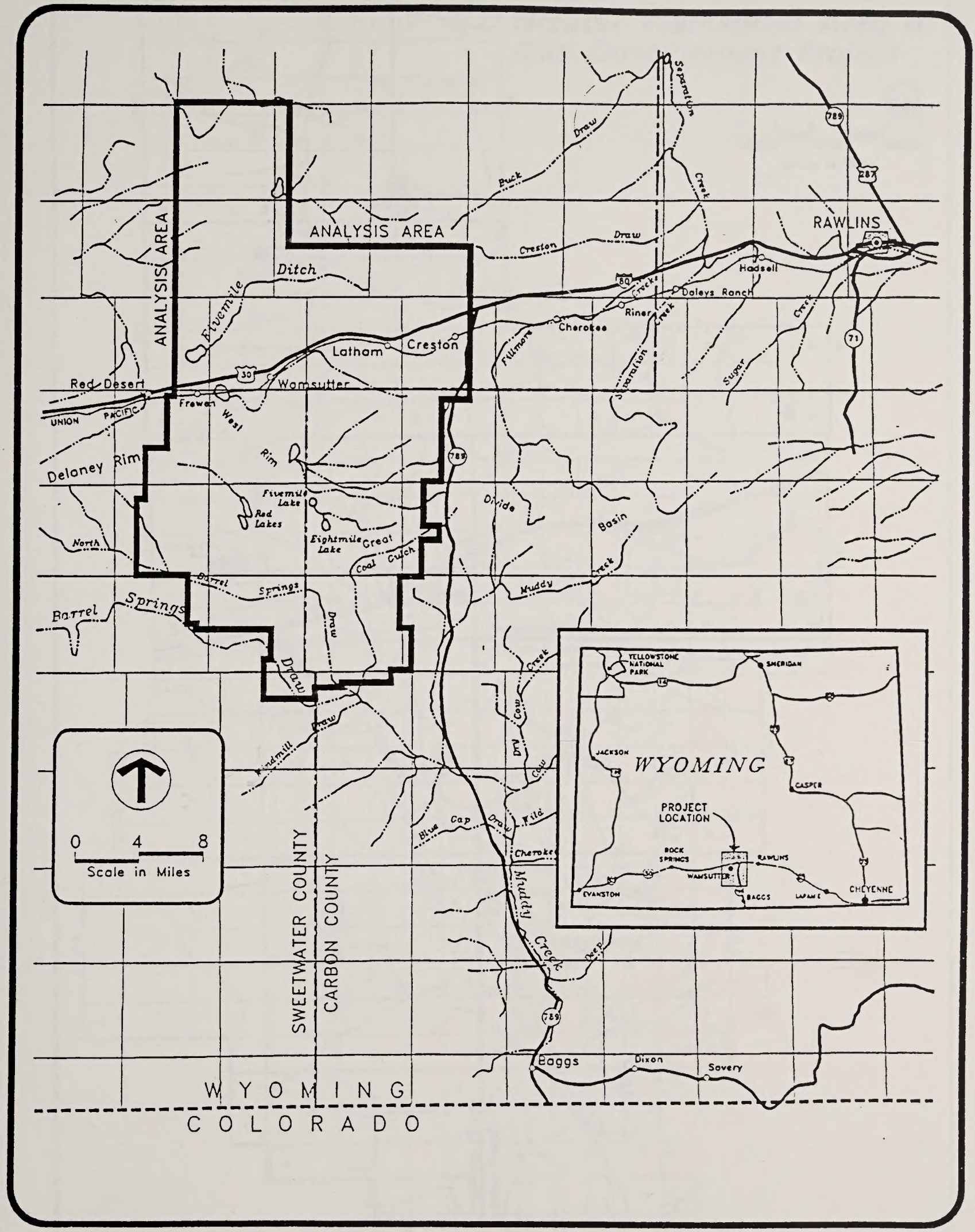


Exhibit 1. Area Map - Location of the GWA II Analysis Area in South-Central Wyoming.



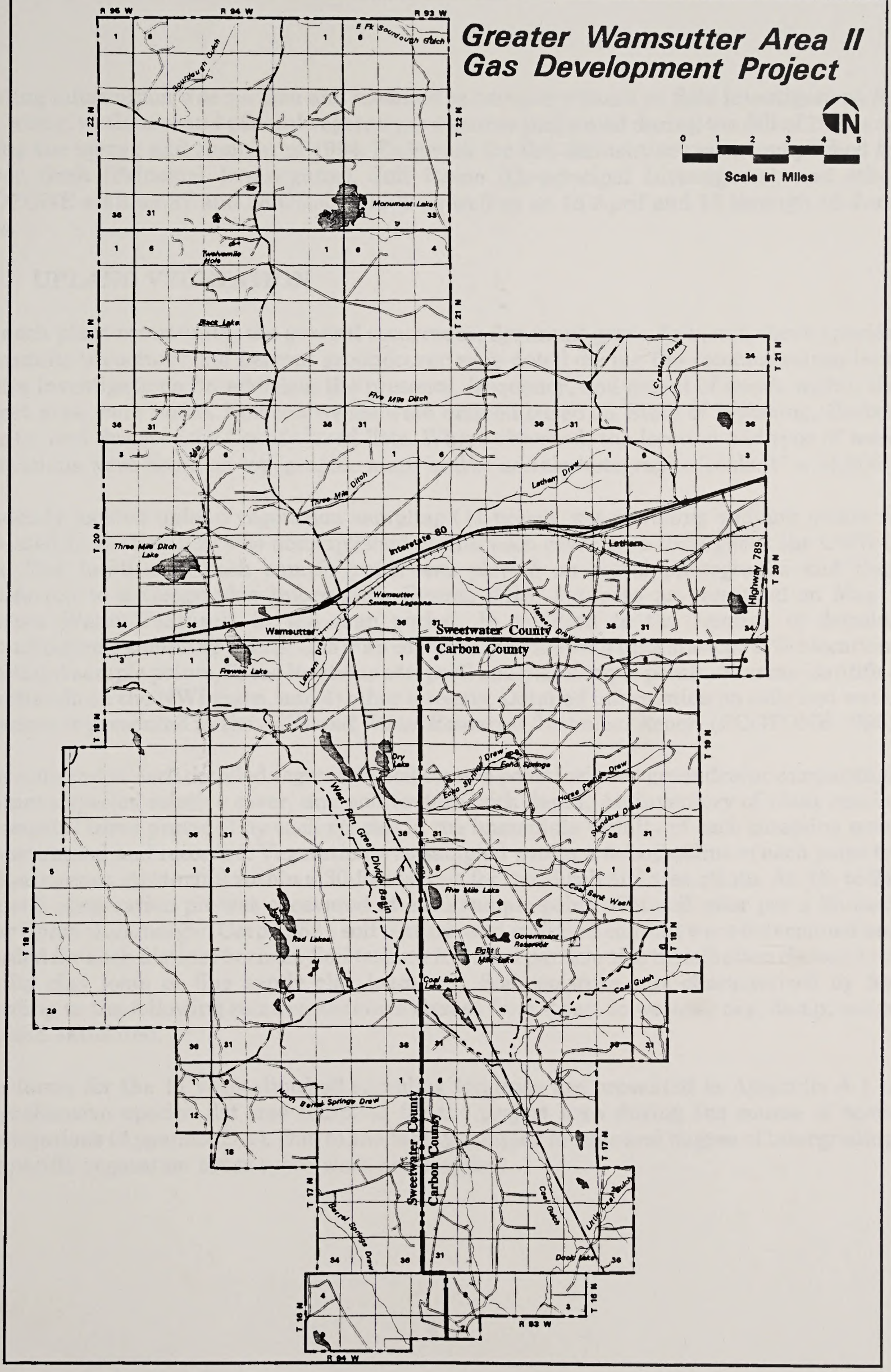
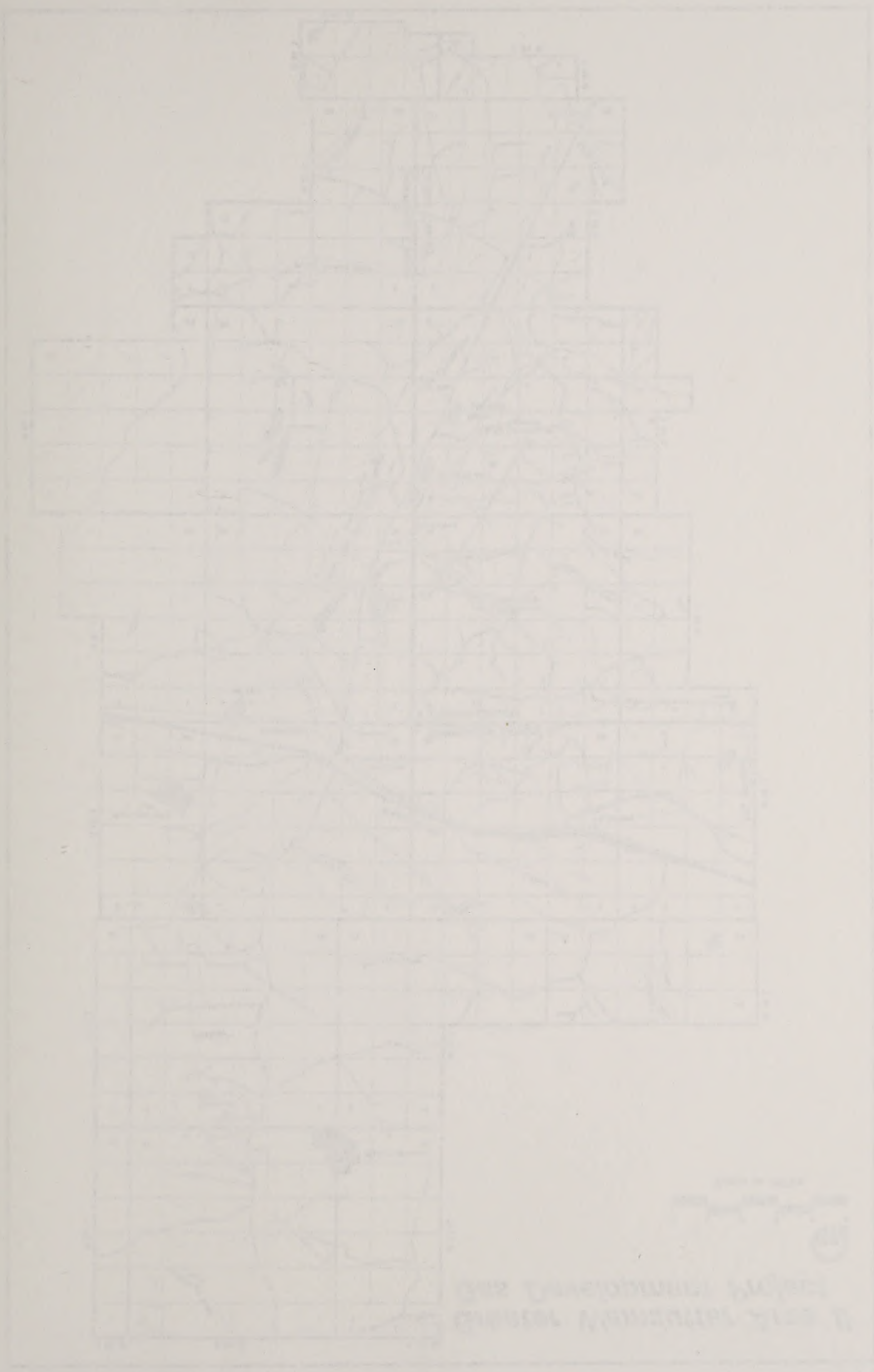


Exhibit 2. Vicinity Map - Geographic Features within the GWA II Analysis Area.



Existing information was verified and modified as necessary based on field investigations for soil, water, wetlands, and general vegetation resources performed during the fall of 1993 and during the spring and summer of 1994. Fieldwork for this delineation was accomplished by Oliver Grah (Principal Investigator), Juli Crane (Co-principal Investigator), and other ECOTONE staff on 27 and 28 October 1993 as well as on 18 April and 13 through 16 June 1994.

2.1 UPLAND VEGETATION

For each plant community, the general occurrence; dominant grass, forb, and shrub species; community structure; and percent groundcover were noted during the reconnaissance-level on-site investigations. In addition, the presence, frequency, and extent of weeds within the project area were noted. Noxious weeds were defined based on State of Wyoming, Carbon County, and Sweetwater County weed lists. Where observed, the location and type of weed infestations were noted on topographic maps and/or aerial photographs (scale: 1" = 24,000').

Randomly located upland vegetation sampling (11 points, not including wetland points as discussed in Section 2.2) was accomplished within each cover type throughout the GWA II area. The location of each sample point was plotted on aerial photographs and then transferred to a Geographic Information System (GIS) database as presented on Map 1 (Surface Water Features) in the map pocket. In addition to the location of detailed vegetation/soils sampling points, this map contains the following information: 1) the locations of wetland sample points, 2) the locations of topsoil analysis sample points, 3) areas identified as wetlands on the NWI maps, and 4) other streams. Detailed information on soils and water resources is presented in the *Soils and Water Resources Technical Report* (ECOTONE 1995).

Data collected at each detailed vegetation/soil sample point included groundcover composition, dominant species relative cover, and soil texture with depth. An inventory of plant species and vegetal cover provided by each species in the immediate vicinity of each sampling point was estimated and recorded. Vegetation was sampled within a 6-foot radius of each point for the herbaceous strata and within a 30-foot radius for the shrub and tree strata. An 18- to 24-inch soil observation pit was excavated at each sample point. Wet soil color per a Munsell Color Chart (Kollmorgen Corp 1988), soil texture, and moisture content were determined and recorded for each distinct horizon. Soil texture included particle size distribution classes such as silty clay loam or fine sandy clay loam, etc. Soil moisture was characterized by feel according to the following relative moisture classes from driest to wettest: dry, damp, moist, wet, and saturated.

Data forms for the 11 vegetation/soil sampling locations are presented in Appendix A-1. A comprehensive species list was compiled for the project area during the course of onsite investigations (Appendix B-1). Due to the highly complex mosaic and degree of intergrading, the specific vegetation cover types were not mapped.

2.2 WATERS OF THE U.S., INCLUDING WETLANDS AND OTHER SPECIAL AQUATIC SITES[1]

Because of the large size of the GWA II analysis area, the great detail of field evaluation needed to accurately identify and delineate wetlands, and the lack of site-specific locations for proposed gas development facilities (i.e., roads, pipelines, and drill/well sites), potential wetland areas were initially identified using NWI maps produced by the FWS. Aerial photographs (scale 1" = 24,000') of the project area were also used to locate areas of potential wetlands not identified on the NWI maps.

Information from the NWI maps was assembled into the GIS database. The location and classification of identified wetlands was confirmed during the spring and summer of 1994 via groundtruthing and limited 3-parameter sampling (i.e., vegetation, soils, and hydrology). Ground-truthing was accomplished because 1) the wetlands identified on the NWI maps are presented on a small scale of resolution (i.e., 1:24,000) and receive little verification because 2) the NWI wetland areas were identified using a different method than presented in the 1987 COE manual.

A detailed jurisdictional wetland inventory and mapping survey required for Section 404 permitting were not performed specific to the project area. Limited three-parameter sampling accomplished for this project followed the Routine Onsite-determination method described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). During the course of the investigation, 54 sample points were placed to sample and characterize wetlands and special aquatic sites. Sample points were located in positions that would likely maximize the relevant information obtained. Generally, most sample points were placed in suspect wetland areas as identified on the NWI map, noted from the aerial photographs, and/or found in the field. Sample points were also placed in upland areas adjacent to the wetlands to verify the wetland boundaries. Wetland sample point locations are shown on Map 1 presented in the Map pocket. As indicated in Section 2.1, this map also depicts the wetland areas identified on the NWI maps and drainage channels that qualify as waters of the U.S. One should note that the depicted wetland polygons (both greater and smaller than 10 acres) do not represent *jurisdictional* wetland areas; however, jurisdictional wetlands generally occur within the wetland polygon areas as determined during field reconnaissance. Detailed delineation of jurisdictional wetland areas, as required for compliance with Section 404 of the Clean Water Act, would occur during the final planning stage for well site locations placed near wetland areas as identified on Map 1.

The location of each wetland sample point was noted relative to geomorphic, vegetative, or hydrologic features. An inventory of plant species, indicator status, and vegetal cover provided by each species in the immediate vicinity of the point was estimated and recorded, if present, using the 6-foot and 30-foot radii described in Section 2.1. The wetland indicator status of each species was determined using the *National List of Plant Species that Occur in Wetlands: Northwest (Region 9)* and the supplement to that list (Reed 1988, 1993). Soil sampling was also accomplished as described in that section. In addition, however, notes on soil color included any mottles or gley layers that were observed.

---

[1] See Section 3.2.1 for definitions of these terms.

Data forms were filled out for each wetland sample point evaluated (Appendix A-2). The data forms summarize the existing characteristics of a specific sample point as well as the decision-making process used to determine whether or not that site qualifies as a jurisdictional wetland.

Areas exhibiting suspect wetland conditions were **not** sampled with sufficient intensity to comprehensively determine the boundaries of jurisdictional areas, if present. As such, wetland investigations were accomplished to allow an evaluation of project impacts as disclosed in the EIS (USDI-BLM 1995) and to support potential future 404(b)(1) permit application but do not replace detailed investigations necessary for CWA 404(b)(1) compliance.

Functional values refer to the social and/or ecological values offered by wetlands and special aquatic sites. These include groundwater discharge and recharge, flood storage and desynchronization, shoreline anchoring and dissipation of erosive forces, sediment and nutrient trapping, food chain support, wildlife and fish habitat, and socioeconomic qualities or benefits. Professional judgement and evaluation (following Adamus [1983], Adamus and Stockwell [1983], and Adamus et al. [1987] and based on observations of the vegetation, hydrology, soils, and topography) were used to qualitatively determine the central tendency of functional values for wetland cover types. Due to the large number of wetland areas, no attempt was made to assess the functional values of each wetland. Assigned values inherently incorporate differences created by the dissimilarity in cover type vegetation height, condition, and hydroperiod.

2.3 PLANT SPECIES OF CONCERN, INCLUDING BLM SPECIAL STATUS PLANTS

Plant species of concern for the GWA II project include those listed as threatened (T) or endangered (E) under the federal Endangered Species Act of 1973 (ESA), species proposed for federal listing (P), candidate species (C1, C2, and 3C), and other species or communities identified by the BLM (special status plants[2]) and to the WYNDD. A list of such plants was compiled for the project area via correspondence and personal communication with the BLM, FWS, and WYNDD.

Per standard rare plant survey work and as recommended by Nelson (1986), descriptions of plant species of concern and their preferred habitats were compiled from existing information prior to field investigations. Available information was collected on the taxonomic description of each species of concern (including illustrations where possible), phenology and ecology, endangerment assessment, and known locations. In addition, plant specimens and herbarium

---

[2] Any plant species considered rare or subject to endangerment and officially tracked through the BLM's decision-making process is a BLM special status plant. These plants primarily include threatened and endangered species, species proposed for listing, and candidate species for listing. Special status plants may also include other plants that a BLM T&E coordinator considers rare for his/her resource area or district. A list of special status plants is developed by the BLM for each specific project within a specific geographic area.

sheet labels housed at the Rocky Mountain Herbarium at the University of Wyoming in Laramie were reviewed and photocopied.

Clearance surveys for plant species of concern were not performed for this project as specific locations of project facilities were not identified for the EIS. However, data on plant species of concern were verified and modified based on reconnaissance-level investigations made while performing fieldwork for soil, water, general vegetation, and wetland resources. Observations on soils and general vegetation were used to identify the habitat potential for plant species of concern. Based on these habitat observations the likelihood of occurrence was determined for each species.

2.4 CUMULATIVE IMPACTS

Cumulative impacts include vegetation impacts from ongoing activities, recently constructed projects, and projects likely to be implemented in the near future (i.e., reasonably foreseeable future actions or RFFA). Cumulative effects are both additive and interactive. Recent BLM guidance strongly recommends that natural resources related to watershed function and stability be evaluated for cumulative impacts on a watershed basis (USDI-BLM 1994). As such, the cumulative impact analysis for vegetation and wetlands was accomplished on a watershed basis using U.S. Geological Survey (USGS)-delineated watersheds and hydrologic units (USGS undated). Cumulative impacts can be divided into two geographic areas: those within the GWA II analysis area and those occurring outside the analysis area. The sum of these two is referred to as the cumulative impacts analysis (CIA) area.

Since the cumulative impacts assessment involves the degree of existing disturbance, detailed aerial photo interpretation (photography flown in May 1994) was accomplished for the GWA II analysis area to identify, delineate, and map all discernable existing disturbances. A GIS database was used to develop a base map of existing disturbance within the GWA II analysis area as well as a digital database that can be manipulated by computer software for analysis purposes. Disturbances for areas outside the GWA II but within the CIA watershed were identified from features on topographic maps as well as from a map identifying mineral development projects in southwest Wyoming. For the latter, only the projects occurring entirely or partially within the watershed of the analysis area were addressed under cumulative impacts.

The *Soils and Water Resources Technical Report* (ECOTONE 1995) describes the methodology used for the Cumulative Impacts process in greater detail.

3.0 AFFECTED ENVIRONMENT

3.1 GENERAL VEGETATION

Vegetation in the GWA II analysis area is typical of the semi-arid Wyoming Basin floristic region. Precipitation, evapotranspiration, and soil parent material are controlling factors for plant composition; variations in these factors produces considerable vegetation diversity. However, vegetation often appears sparse, with low productivity. The low rate of productivity

restricts revegetation/reclamation potential in areas of earth-surface disturbance (Lowham et al. 1985). Groundcover is primarily comprised of drought-tolerant shrubs and grasses. Halophytic shrubs (i.e., shrubs adapted to growing in salty soils) occur along drainages and in topographically lower areas. Trees are generally absent although scattered juniper may occur along hills and breaks (Lowham et al. 1985).

3.1.1 Cover Types

Ten cover types are present in the analysis area: mixed desert shrub (sagebrush-grassland and salt desert scrub phases), barren land/cushion plant, urban land, disturbed land, marsh, wet meadow (fresh and saline subirrigated), mudflat/playa, aquatic bed, open water, and riverine. The following descriptions primarily address the central tendency in the character of these cover types in the project area. As waters of the United States (see definition in Section 3.2) are more variable over the growing season, their descriptions describe the more common variations. Data from sampling cover type areas, both uplands and wetlands, are presented in Appendix A. Appendix B-1 presents a comprehensive species list.

3.1.1.1 Mixed Desert Shrub

The mixed desert shrub cover type consists of two phases. The sagebrush-grassland phase occurs on upland positions with varying slope. Soils tend towards sandy and loamy textures. Some areas have very shallow soils. Vegetation is primarily grasses (60 percent), with some woody plants (25 percent) and forbs (15 percent). Percent groundcover is low to moderately low (15 to 35 percent). Dominant shrub species include Wyoming big sagebrush, basin big sagebrush, black sagebrush (*A. nova*), low rabbitbrush (*Chrysothamnus viscidiflorus*), winterfat (*Ceratoides lanata*), and antelope bitterbrush (*Purshia tridentata*). In addition, there are shrub species common to the salt desert scrub phase (described subsequently). Forbs and grasses include western wheatgrass (*Agropyron smithii*), bluebunch wheatgrass (*A. spicatum*), thickspike wheatgrass (*A. dasystachyum*), needle-and-thread (*Stipa comata*), Basin wildrye (*Elymus cinereus*), Indian ricegrass (*Oryzopsis hymenoides*), bottlebrush squirreltail (*Sitanion hystrix*), wild buckwheat (*Eriogonum* spp.), fleabane (*Eriogonum* spp.), beardtongue (*Penstemon* spp.), paintbrush (*Castilleja* spp.), and pussytoes (*Antennaria* spp.). As site conditions deteriorate, sagebrush, plains pricklypear (*Opuntia polyacantha*), rabbitbrush, spiny hopsage (*Grayia spinosa*), and Sandberg bluegrass (*Poa secunda*) become more dominant. Groundcover ranges from sparse to moderate (10 to 40 percent).

The salt desert scrub phase corresponds with the saltbush type described by BLM (USDI-BLM 1985). As indicated in the BLM's preliminary soil survey information (USDI-BLM 1975-1980, USDI-BLM 1978, USDI-BLM 1987, TRC 1982), the diverse species composition is dominated by widely-spaced, low-growing, small-leaved shrubs that are often spiny and tolerant of saline and or alkaline soil conditions.

In upland areas, the salt desert scrub phase occurs on soils that tend towards loams and clays; however, it may occur in lighter-textured soils that have higher salt content and/or alkalinity. Vegetation is generally comprised of 75 percent graminoids, 15 percent woody plants, and 10 percent forbs. Groundcover ranges from 20 to 35 percent. Typical shrubs include shadscale (*Atriplex confertifolia*), spiny hopsage, Gardner saltbush (*A. gardneri*), mat saltbush (*A. corrugata*), birdfoot sagewort (*Artemisia pedatifida*), budsage (*A. spinescens*), big

sagebrush, rubber rabbitbrush (*Chrysothamnus nauseosus*), green ephedra (*Ephedra viridis*), and spiny horsebrush (*Tetradymia spinosa*). Species in the intershrub areas include thickspike wheatgrass, western wheatgrass, bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass, wild buckwheat, globemallow (*Sphaeralcea* spp.), milkvetch (*Astragalus* spp.), alkali sacaton (*Sporobolus airoides*), galleta grass (*Hilaria jamesii*), and phlox (*Phlox* spp.). Species such as rabbitbrush, western yarrow (*Achillea millefolium*), birdfoot sagebrush, plains pricklypear, and greenmolly (*Kochia americana*) become more dominant as the range condition deteriorates.

The salt desert scrub phase also occurs on gently sloping land along perennial or intermittent streams, in dry washes, and in relatively flat basin lowlands. Plants in these areas are able to tolerate heavy soil textures and/or high salinity/alkalinity; woody plants are able to take advantage of the water table (below 3 feet). Vegetation is comprised of 60 percent graminoids, 30 percent woody shrubs, and 10 percent forbs. Dominant understory species include western wheatgrass, thickspike wheatgrass, alkali sacaton, basin wildrye, Sandberg bluegrass, and bottlebrush squirreltail. Greasewood (*Sarcobatus vermiculatus*) and Gardner saltbush are the dominant shrubs. Groundcover ranges from 55 to 70 percent. Undesirable, weedy species include cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), pepperweed (*Lepidium* spp.), and other annuals. Also, greasewood becomes more dominant as the cover type condition deteriorates.

3.1.1.2 Barren Land/Cushion Plant

Rock outcrops, active sand dunes, extremely steep or rocky badland breaks, riverwash deposits and highly wind-swept slopes and ridges are typically devoid of vegetation or have sparse cover except in isolated areas. Vegetative cover is typically less than 20 percent. On badland areas, species are predominantly comprised of Indian ricegrass, mat saltbush, greasewood, stemless goldenweed (*Haplopappus acaulis*), and foliose lichens.

In cushion plant areas, low-growing, mat-forming plants dominate, such as fringed sagebrush (*Artemisia frigida*), birdfoot sagebrush, Gardner saltbush, low sagebrush (*A. arbuscula*), low rabbitbrush, hooker sandwort (*Arenaria hookeri*), two-grooved locoweed (*Astragalus bisulcatus*), spoonleaf milkvetch (*A. spatulatus*), cushion buckwheat (*Eriogonum ovalifolium*), short-stemmed wild buckwheat (*E. brevicaule*), stemless goldenweed, pingue hymenoxys (*Hymenoxys richardsonii*), moss phlox (*Phlox bryoides*), hoods phlox (*Phlox hoodii*), thickspike wheatgrass, Indian ricegrass, bottlebrush squirreltail, and pinewoods needlegrass (*Stipa pinetorum*).

3.1.1.3 Urban Land

Urban lands include all areas that have been converted from natural cover to alternate cover types, including roads, highways, driveways, residential housing, commercial buildings, industrial facilities, etc. When present, vegetation is dominated by weedy species.

3.1.1.4 Disturbed Land

This cover type occurs where earth-surface disturbance has altered the native vegetation composition. Disturbances may have resulted from livestock grazing and trampling, off-road

vehicle operation, vegetation clearing and soil disturbance due to road or oil/gas well site construction, etc. Species present are those typically associated with soil disturbance, and often include weed species. Common weedy plants include cheatgrass, six-weeks fescue (*Festuca octoflora*), halogeton, clasping pepperweed (*Lepidium perfoliatum*), and Russian thistle (*Salsola iberica*). Groundcover is variable.

3.1.1.5 Wet Meadow

The wet meadow cover type occurs on nearly level, poorly drained lands adjacent to perennial and intermittent stream channels and seeps as well as on broad, low lake terraces, plains and alluvial bottoms. Such areas may have surface ponding due to runoff from adjacent areas, occasional stream overflow, and/or a fluctuating water table. There are two phases: fresh wet meadow and saline subirrigated wet meadow.

The fresh wet meadow phase typically occurs in areas of seeps and springs and adjacent to perennial and intermittent stream channels. Species include Nebraska sedge (*Carex nebrascensis*), redtop (*Agrostis stolonifera*), foxtail barley (*Hordeum jubatum*), and Baltic rush (*Juncus balticus*). The saline subirrigated meadow phase occurs in topographic basin depressions that collect surface runoff and in other locations where evaporation increases the salt content of the soil surface. Plants in areas of saline subirrigated meadow are capable of tolerating high salinity/alkalinity as well as high water tables. The primary species in saline areas include foxtail barley, basin wildrye, Nuttall's alkaligrass (*Puccinellia nuttalliana*), mat muhly (*Muhlenbergia richardsonis*), field milkvetch (*Astragalus agrestis*), Baltic rush (*Juncus balticus*), and saltgrass (*Distichlis spicata*). As site conditions deteriorate, species such as greasewood, inland saltgrass, thistles (*Cirsium* spp.), and alkali muhly (*Muhlenbergia asperifolia*) increase.

Groundcover for the wet meadow cover type is moderate to moderately dense (65 to 80 percent). This cover type has minimal shrubs (10 percent) and herbs (10 percent); graminoid species dominate (80 percent). When present, weedy species include cheatgrass, broom snakeweed (*Gutierrezia sarothrae*), halogeton, and curlycup gumweed (*Grindelia squarrosa*). Some areas of wet meadow qualify as jurisdictional wetlands and/or waters of the U.S.

3.1.1.6 Marsh

Areas of marsh occur where permanent or seasonal inundation occurs such that hydrophytic (i.e., water-loving) species can establish and exist. Marshes have emergent vegetation such as cattail (*Typha latifolia*), Baltic rush, creeping spikerush (*Eleocharis palustris*), and bulrush (*Scirpus* spp.). Groundcover is typically very dense (>90 percent). Areas that appear to be aquatic bed or open water during the early portion of the growing season may appear as marsh once vegetation has emerged above the water level later in the growing season.

3.1.1.7 Mudflat/Playa

This cover type occurs in the topographically lowest areas and is typically associated with internally drained basins. A playa is an area where evaporation exceeds inflow. This cover type typically consists of the dried-up bed of ephemeral lakes, usually with a high soil salt concentration. As the name implies, water is ephemeral and occurs during a portion of the

year--typically early during the growing season. Such areas lack vegetation or support limited vegetation (5 to 35 percent cover). When present, vegetation may include poverty weed (*Iva axillaris*), western wheatgrass, saltgrass, alkaligrass, and seepweed (*Suaeda* spp.). Scattered iodinebush (*Allenrolfea occidentalis*) and greasewood shrubs also occur within this cover type. Shrub height is typically less than 3 feet. Due to the high clay content of the soil and internal drainage, the surface ponds water readily. The water depth is generally less than 4 inches. As such, this cover type does not support standing water except following runoff events. This cover type may shift to aquatic bed or open water areas when basins contain water. Typically, the mudflat/playa depression supports a fringe of saline subirrigated wet meadow vegetation. All of this cover type qualifies as a waters of the U.S., and a portion qualifies as jurisdictional wetland.

3.1.1.8 Aquatic Bed

Areas of aquatic bed are primarily associated with pooled water in reservoirs, internally drained basins, channel potholes, and stock watering ponds that support surface inundation for a sufficient period for floating-leaved and submerged plants to occur. Aquatic bed areas have reduced water flow velocity. Such areas are shallow (generally < 3 ft. deep) and often stagnant due to warm water temperatures, poor water circulation, and high biochemical oxygen demand. Areas that appear to be aquatic bed during the early to mid-growing season may appear to be marsh or wet meadow once vegetation emerges above the water level. Alternatively, aquatic bed areas may be considered open water early during the growing season before submerged or floating-leaved plants develop or mudflat/playa when water infiltrates/evaporates. Many of these areas are waters of the U.S., and some qualify as special aquatic sites and jurisdictional wetlands.

3.1.1.9 Open Water

Areas of open water are primarily associated with pooled water in reservoirs and stock watering ponds as well as the ephemeral surface ponding of playa depressions. They may also occur in channels where flow velocities have scoured out "potholes." Open water areas lack the submerged or floating-leaved plants present in aquatic bed areas, nor do they support emergent vegetation as do the marsh and wet meadow cover types. Areas that appear as open water early in the growing season may develop aquatic bed or marsh vegetation or may become a mudflat/playa later in the growing season when water infiltrates or evaporates.

3.1.1.10 Riverine

Riverine areas are waters of the U.S. comprised of flowing, channelized water. Streams, primarily intermittent to ephemeral stream channels rivers as well as their exposed channel banks, are included in this cover type. Riverine areas have little vegetation growing within the channel. Impoundments created within a channel are considered aquatic bed or open water areas as they are not free-flowing. The *Soil and Water Resources Technical Report* (ECOTONE 1995) further describes water resources, including riverine areas, occurring within the project area. Vegetated point bars and banks within the channel (as well as vegetated floodplains) are addressed under the wet meadow cover type. Potholes containing submerged vegetation and ponded water are addressed under the aquatic bed and open water cover types.

3.1.2 Weeds and Poisonous Plants

Information on weeds and poisonous plants was obtained from Alley and Lee (1979), Carbon County Weed & Pest District (1994), Holmgren and Anderson (1971), James and Kaller (1980), Sweetwater County Weed & Pest District (1994), Vallentine (1971), Whitson et al. (1991 and 1987), and USDI-BLM (1985).

3.1.2.1 Weeds

Weeds are undesirable plants that are not native to a given area. There are concerns about the establishment and dominance of weeds in the project area because weed species often out-compete the more desirable native species and provide a high degree of visual contrast with the surrounding native vegetation. Further, weeds often reduce the productivity of a site and reduce the value of the forage to wildlife and livestock.

Weeds occur throughout the project area at varying densities and frequencies. More weeds occur on and around areas that have been disturbed (by humans or animals), such as along or near roads, highways, drill sites, livestock watering areas, etc. The State of Wyoming has identified 20 noxious weeds[3] (Table 1); however, not all may occur in the project area. In addition to these species, Sweetwater County adds foxtail barley and Carbon County includes Geyer larkspur (*Delphinium geyeri*) in the comprehensive noxious weed list for the project area (Sweetwater County Weed & Pest District 1994, Carbon County Weed & Pest District 1994).

3.1.2.2 Poisonous Plants

Poisonous plants are native/introduced plants that cause injury to an animal that ingests them. This injury is due to the presence of a toxic chemical agent. The most common poisonous plants within the project area are halogeton (*Halogeton glomeratus*), milkvetch (*Astragalus* spp.), and locoweed (*Oxytropis* spp.). Other poisonous plants include larkspur (*Delphinium* spp.), horsebrush (*Tetradymia* spp.), greasewood, deathcamas (*Zigadenus* spp.), arrowgrass (*Triglochin maritima*), tansy mustard (*Descurainia pinnata*), and cocklebur (*Xanthium* spp.).

Halogeton readily invades alkaline soils and semi-arid environments, particularly at disturbed sites. The plant, most commonly found along roadsides or places where livestock congregate, is most dangerous in fall and winter. While all livestock are at risk, sheep are most particularly affected. Concentrations of sodium (oxalic acid) in the plant tissues cause poisoning. Because this plant is readily grazed at times, it can cause thousands of livestock poisonings.

Milkvetch and locoweed both occur in habitat ranging from deserts to mountains and are dangerous during all seasons, but especially in spring. All classes of livestock may be

---

[3] A noxious weed is an officially designated undesirable or invading weedy species generally introduced into an area due to human activity.

Table 1. Designated Noxious Weeds in Wyoming.[1]

SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME	COMMON NAME
Agropyron repens	Quackgrass	*Convolvulus arvensis*	Field bindweed
Arctium minus	Common burdock	*Cynoglossum officinale*	Houndstongue
Cardaria draba, C. pubescens	Hoary cress, whitetop	*Euphorbia esula*	Leafy spurge
Carduus acanthoides	Plumeless thistle	*Fraseria discolor*	Skeletonleaf bursage
Carduus nutans	Musk thistle	*Isatis tinctoria*	Dyers woad
Centaurea diffusa	Diffuse knapweed	*Lepidium latifolium*	Perennial pepperweed
Centaurea maculosa	Spotted knapweed	*Linaria dalmatica*	Dalmatian toadflax
Centaurea repens	Russian knapweed	*Linaria vulgaris*	Yellow toadflax
Chrysanthemum leucanthemum	Ox-eye daisy	*Onopordum acanthium*	Scotch thistle
Cirsium arvense	Canada thistle	*Sonchus arvensis*	Perennial sowthistle

1 - Sources: Sweetwater County Weed and Pest District, 1994; Carbon County Weed and Pest District, 1994.

poisoned by these plants, particularly since the poisoning condition is cumulative and the consumption of the plant can become habit-forming. Symptoms of poisoning include crazed action.

Alkaloids are the toxic agent in larkspur and can cause fatal poisonings in cattle, particularly in early spring. Sheep and horses, however, are rarely affected.

Horsebrush is poisonous to all classes of livestock but especially to sheep. The season it is most dangerous is spring. The effects of poisoning include photosensitivity and bighead.

Greasewood, a plant that grows in alkaline bottomlands and washes, may poison all livestock, but mostly sheep. Poisoning occurs due to the presence of oxalic acid. Poisoning is most acute if the plant is eaten in large quantity on spring trails over a short period of time and in the absence of other forage (USDI-BLM 1983).

Deathcamas is dangerous to all classes of livestock in early spring, but especially to sheep. Arrowgrass grows in wet and alkaline bottomland habitat. This forb is dangerous during all seasons and is dangerous to all classes of livestock. Toxic effects are more pronounced when the plant is frozen or during drought. Hydrocyanic acid is the poisoning agent. Horses are

particularly susceptible to this plant. Tansy mustard, poisonous to cattle during the summer, grows in sandy alkaline soils. Poisoning occurs when large amounts are ingested over long periods of time.

Cocklebur is harmful to all livestock but especially cattle and pigs. Spring is the season of greatest danger. The effects of this plant are not cumulative, and the older plants are generally safe. Cocklebur grows in irrigated fields and wet places.

Selenium, an essential element in very low concentrations, may be poisonous to livestock if ingested in high amounts. Selenium indicator plants include milkvetches, goldenweed, woodyaster (*Xylorhiza glabriuscula*) and prince's plume (*Stanleya pinnata*).

3.2 WATERS OF THE U.S., INCLUDING WETLANDS AND OTHER SPECIAL AQUATIC SITES

3.2.1 Definitions

Considerable confusion exists about the differences between the terms special aquatic sites, wetlands, and jurisdictional wetlands. The distinction and overlap between these terms is best explained within the greater context of waters of the U.S. The link between these terms and waters of the U.S. is crucial from a regulatory standpoint.

Waters of the U.S. is a collective term that covers all areas subject to regulation by the COE pursuant to the CWA. In brief, they include the territorial seas; interstate waters; navigable waterways (such as lakes, rivers, and streams), special aquatic sites, and wetlands that are, have been, or could be used for travel, commerce, or industrial purposes; tributaries; and impoundments of such waters (33 CFR 328.3). Waters of the U.S. within the analysis corridor include special aquatic sites, jurisdictional wetlands, actively flowing stream channels, dry drainages with active channels, and all open water areas.

Special aquatic sites represent a subset of waters of the U.S. and are defined as "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values" (40 CFR 230.3). Special aquatic sites include sanctuaries, refuges, mud flats, vegetated shallows [aquatic bed], coral reefs, pool and riffle complexes, and wetlands (40 CFR 230, Subpart E; underline added).

Wetlands are a subset of special aquatic sites. The CWA defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(a)(7)(b)). Wetlands are subject to the same COE regulation as special aquatic sites.

Jurisdictional wetlands are "[t]hose wetlands which are within the extent of COE regulatory overview" (33 CFR 328.1 and 2). As such, not all wetlands are regulated by the COE (non-jurisdictional wetlands). To be subject to COE jurisdiction, a wetland must meet three criteria. It must have 1) a dominance of hydrophytic plants, 2) the presence of hydric soils, and 3) the presence of surface or subsurface water (i.e., wetland hydrology) to support

1 and 2 (above). These conditions must occur under normal circumstances under today's conditions. The 1987 Corps Manual describes technical criteria for determining the presence of hydrophytic vegetation, hydric soils, and wetland hydrology, and therefore the occurrence of jurisdictional wetlands.

Hydrophytic plants are those species that either require or tolerate wet or saturated soils and are therefore indicative of these conditions. Vegetation present on a given area is a good indicator of the physical conditions of the site. Such conditions include soil moisture. For vegetation on a given area to be considered hydrophytic, more than 50 percent of the total vegetal cover and/or species composition must be comprised of species typically adapted for life in saturated soil conditions. Such species have been assigned a wetland indicator status of facultative (FAC), facultative wetland (FACW), or obligate (OBL). Disturbed wetland sites may be covered by weedy species with FAC, facultative upland (FACU) and/or upland (UPL) indicator status due to the aggressive character of such species. Therefore, a careful evaluation of soil character and site hydrology must be made to determine if hydrophytic vegetation would be present under normal circumstances if the disturbance had not occurred.

A **hydric soil** is a soil that is saturated, flooded, or ponded with water long enough during the growing season (i.e., soil temperature of 41°F at 20 inches depth) to develop anaerobic soil conditions (i.e., reduced oxygen levels). These soils develop characteristics that are indicative of the wet and anaerobic conditions. These characteristics include an undecomposed organic surface layer (histic epipedon), surface horizons with low chromas (i.e., very dark brown to black), organic staining and streaking, grey-colored layers or horizons, iron concretions, and/or light grey- or rust-colored mottles or specks of highly contrasting color. These characteristics must generally occur within 50 percent of the root zone or within 18 inches of the soil surface.

Wetland hydrology involves permanent or periodic inundation or saturation to the soil surface for a significant period during the growing season (i.e., at least 5 percent of the growing season) on a regular basis (i.e., 50 percent probability of occurrence. Wetland hydrology may be supplied by surface water (i.e., streams), groundwater, and/or direct precipitation. In cases of saturation from inundation, the saturation generally must occur with a 2-year frequency interval, or 50 out of 100 years.

3.2.2 Administrative Responsibility for and Regulation of Wetlands

Waters of the U.S., including wetlands and other special aquatic sites, are protected and regulated under the CWA. Pursuant to Section 404 of the CWA, the COE has administrative authority to regulate the excavation of and/or discharge of dredge and fill materials into waters of the U.S, including wetlands. The EPA, having overall administrative authority over the CWA, has review and veto authority over all actions pursuant to the CWA. Pursuant to various rules, regulations, and memorandums of understanding, and depending on the specific project, other agencies such as the Forest Service (FS), FWS, BLM, and state Departments of Environmental Quality (DEQ) may exercise review responsibilities, if appropriate, on projects requiring major federal action involving wetlands. Information on the occurrence and type of wetlands involved in a given project assists these agencies in reviewing a project and in making administrative recommendations to the COE and EPA.

In addition to the CWA, other administrative directives that involve wetlands protection on federally administered lands include Executive Orders 11988 (floodplain protection) and 11990 (wetland protection). Special aquatic sites, wetlands, and other areas that are integral to the aquatic system must be given strong consideration when other federal agencies make land use decisions. Avoidance and impact minimization are strategies required by the CWA and these executive orders to reduce the adverse effects on these sensitive areas caused by project implementation.

3.2.3 Waters of the U.S. Cover Types

In general, of the ten cover types previously described, five are special aquatic sites (including wetlands): marsh, wet meadow, mudflat/playa, aquatic bed, open water. There is also one additional "waters of the U.S." cover type present: riverine. Most of the mudflat/playa cover type did not qualify as a special aquatic site for one or more of the following reasons: 1) a dominance of non-hydrophytic species, 2) a dominance of exotic hydrophytes (which are also able to survive in areas without wetland hydrology), 3) the lack of hydric soils, and/or 4) the lack of adequate wetland hydrology (i.e., hydrologic events do not occur at least every other year on the average). Many of the aquatic bed and open water cover type areas were not jurisdictional because they were created on uplands by artificially applied sources of water.

Based on field verification and limited sampling, the NWI maps provide a fairly accurate indication of the presence of wetlands. The maps do not, however, accurately depict the boundaries between uplands and wetlands. Most potential wetland areas were small and scattered widely throughout the analysis area (Exhibit 3) and were primarily associated with topographically low areas and internally drained basins. A few areas were associated with springs and seeps. The condition of these waters of the U.S. cover types was highly variable. As such, the previous descriptions represent arbitrary boundaries along a continuum.

Cowardin et al. (1979) have developed a standardized working classification system for wetlands and special aquatic sites. This system has been institutionalized by several federal agencies (e.g., the Federal Highway Administration and the FWS). The system uses the type and size of hydrologic system, topographic position, dominant life form, duration and periodicity of flooding and/or saturation, and water quality to classify and place each wetland and special aquatic habitat within a hierarchial system. Table 2 classifies each of the waters of the U.S. cover types according to size and the permanence of water.

3.2.4 Jurisdictional Areas Subject to the Clean Water Act

In most places, a continuum exists between the jurisdictional wetlands and adjacent non-jurisdictional areas that exhibit some wetland characteristics such as hydrophytic vegetation. Given a relatively homogeneous vegetation cover type such as a wet meadow, the depth to normal soil saturation may increase over a topographic gradient. As such, the wetter portion of the cover type may qualify as a jurisdictional wetland while a slightly drier portion may not qualify--even though it may appear homogeneous. Summary and interpretation of the wetland data forms (Appendix A-2) yield the following information on the presence of hydric, wetland hydrology, and hydrophytic vegetation. Areas such as the mudflat/playa cover type typically lack the presence of one or more criteria as discussed in Section 2.3.2. These areas, however, are at least waters of the U.S. (Peter 1994). Further, vegetated swales that are 1) dominated by non-hydrophytic species and 2) do not exhibit hydric soils or wetland hydrology are not waters of the U.S. Drainages without special aquatic sites must have an active channel that exhibits relatively stable fluviogeomorphic character (i.e., the channel is "at bed and grade") to qualify as a waters of the U.S.

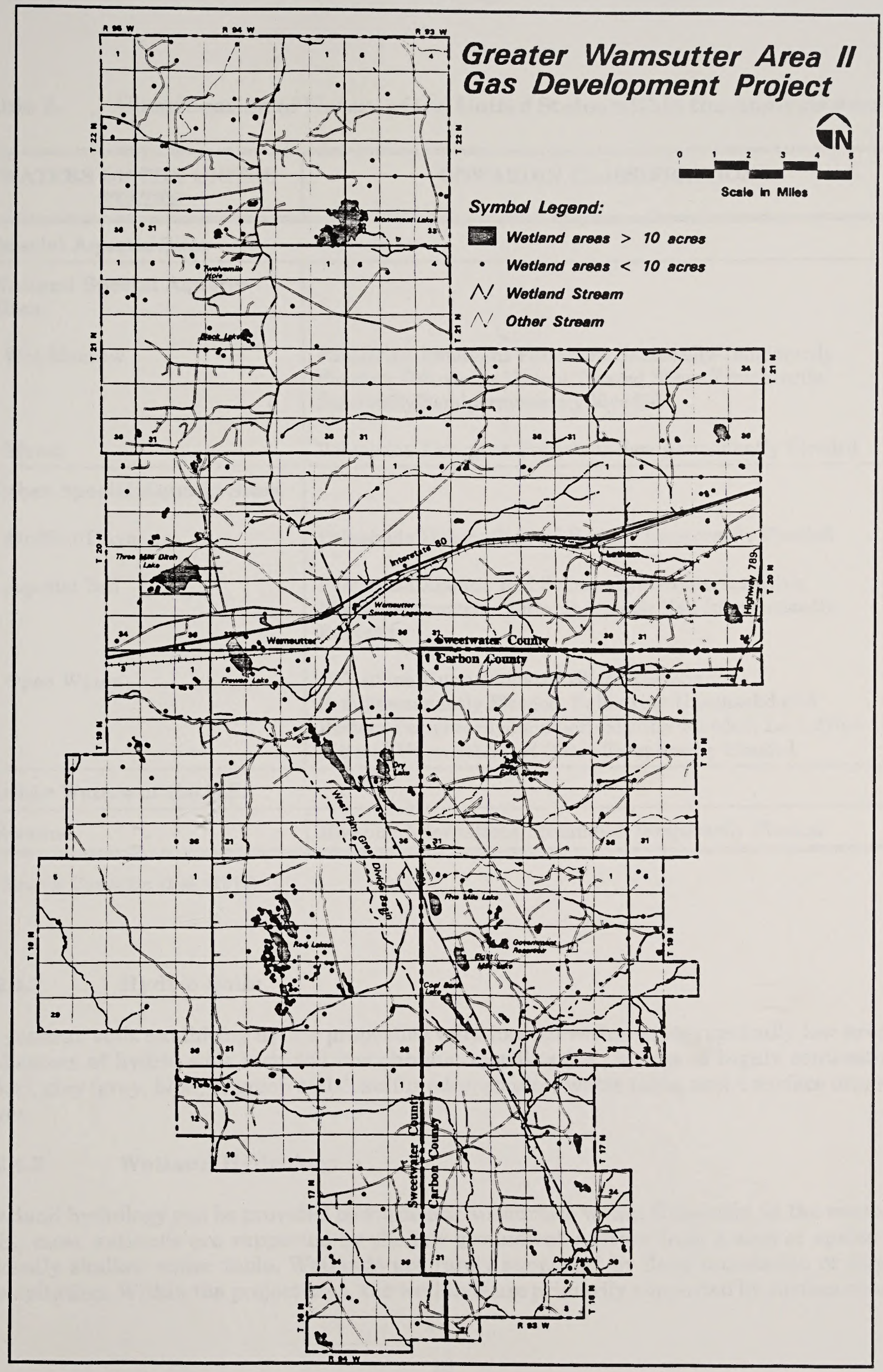


Exhibit 3. National Wetlands Inventory Map of the GWA II Analysis Area.

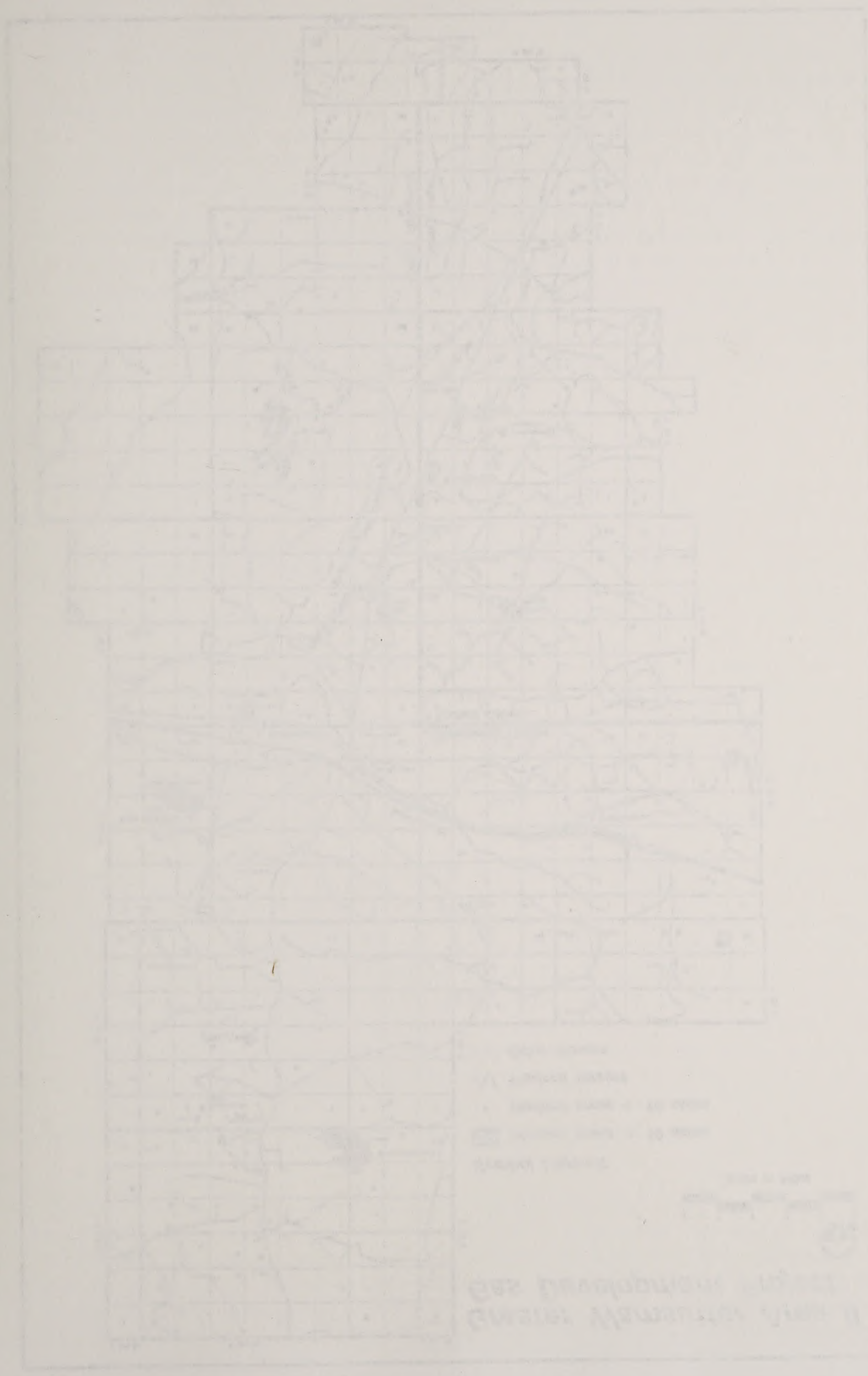


Table 2. Classification of Waters of the United States within the Analysis Area.[1]

WATERS OF THE UNITED STATES	COWARDIN CLASSIFICATION[1]
Special Aquatic Sites	
Wetland Special Aquatic Sites	
Wet Meadow	Palustrine Emergent Persistent Seasonally/Temporarily Flooded; Palustrine Unconsolidated Shore Temporarily/ Seasonally/Semipermanently Flooded
Marsh	Palustrine Emergent Persistent Semipermanently Flooded
Other Special Aquatic Sites	
Mudflat/Playa	Palustrine Unconsolidated Bottom Temporarily Flooded
Aquatic Bed	Palustrine Aquatic Bed Seasonally/Semipermanently Flooded; Lacustrine Littoral Aquatic Bed Intermittently Exposed
Open Water	Palustrine Unconsolidated Shore Seasonally/ Semipermanently Flooded; Palustrine Unconsolidated Bottom Temporarily/Semipermanently Flooded; Lacustrine Littoral Unconsolidated Shore Temporarily Flooded
Other Waters of the U.S.	
Riverine	Riverine Intermittent Streambed Temporarily Flooded

1 - Source: Cowardin et al. (1979)

3.2.4.1 Hydric Soils

In general, soils exhibiting hydric properties were located within topographically low areas. Indicators of hydric soils included low chroma, mottling (i.e., specks of highly contrasting color), gley (grey, blue, or green soils), sulfur odor, shallow water table, and a surface organic layer.

3.2.4.2 Wetland Hydrology

Wetland hydrology can be provided by surface or subsurface water. Generally, in the western U.S., most wetlands are supported by shallow groundwater either from a seep or spring or a locally shallow water table. Wetlands are rarely supported by flood inundation or direct precipitation. Within the project area, the wetlands are primarily supported by surface runoff

and collection in topographically low areas. Primary indicators (i.e., direct evidence) included saturation and sulfur odor. Secondary indicators (i.e., supporting evidence) included rhizospheres, low chroma, gley, and mottles. Further, inundation had been observed earlier during the spring for several of the internally drained basins (e.g., Red Lakes, Eight Mile Lakes, Five Mile Lake, Coal Bank Lake, etc.).

3.2.4.3 Hydrophytic Vegetation

The wetland data forms list vegetation species at each point sampled. Appendix B-2 provides the wetlands indicator status for all species observed in the study area during the overall species inventory as well as during sampling at each of the 54 wetland sample points. All upland cover types lack a dominance of hydrophytic vegetation. On the other hand, marsh and aquatic bed areas meet the hydrophytic vegetation criterion. Many areas of wet meadow also meet the criterion.

3.2.5 Wetland Functional Values

Special aquatic sites, including wetlands, merit special concern due to their relative rarity in the region, their functional role in and as components of hydrologic systems, the unique and important wildlife habitat and forage value they offer, their heritage value, and their protection under the CWA. The physical-biological-cultural functions they offer are of value to the human environment as well as the natural environment. Specifically, wetland functions include groundwater discharge and recharge, flood storage and desynchronization, shoreline anchoring and dissipation of erosive forces, sediment trapping, nutrient and pollutant retention and removal, food chain support, wildlife and fish habitat, and heritage values including active and passive recreation and socioeconomic qualities or benefits (aesthetics; education; recreation, consumptive and non-consumptive; non-consumptive-societal; and global processes) (Adamus and Stockwell 1983).

In addition to these functions, the COE considers "wetlands set aside for study of the aquatic environment or as sanctuaries or refuges" and "wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics" as important to the public interest (33 CFR 320.4(b)).

Many of the functions and values associated with wetlands may be similar for both jurisdictional and non-jurisdictional wetlands as well as for some upland areas. For a specific area, not all functions are performed; those that are performed may not be of the same value as other areas with the same cover type due to the physical and biological characteristics of an individual wetland. Given the large number of small, isolated wetland areas within the GWA II, specific functional values for each wetland area cannot be presented in this document. The following discussion defines each component function and characterizes the central tendencies of wetlands in the project area. Table 3 summarizes the general or average value assigned for each function by cover type.

Table 3. Estimated Functional Values for Wetlands and Riparian Areas within the GWA II Analysis Area.

WATERS OF THE U.S.	FUNCTION[1]								
	GWR	GWD	FSD	SAD	SED	NRR	FCS	HAB	REC
SPECIAL AQUATIC SITES									
Wetland Special Aquatic Sites									
Marsh	+	+	o	o	o	+	+	+	x
Wet Meadow	x	x	x	x	x	x	x	x	x
Other Special Aquatic Sites									
Mudflat/Playa	x	o	o/x	o	+	x/+	x	x	o
Aquatic Bed	+	o	x	o	+	+	x	x	x
Open Water	+	x	x	o	x	+	+	x	x
OTHER WATERS OF THE U.S.									
Riverine	+	x	o	o	x	x	x	+	x

+ - major functional value
x - minor functional value
o - no or minimal functional value
1 - Wetland and Special Aquatic Site Functions (Adamus and Stockwell 1983):

GWR = groundwater recharge
GWD = groundwater discharge
FSD = flood storage and desynchronization
SAD = shoreline anchoring and dissipation of erosive forces
SED = sediment trapping
NRR = nutrient retention and removal
FCS = food chain support
HAB = wildlife and fish habitat
REC = active and passive recreation and heritage value

3.2.5.1 Groundwater Recharge

Groundwater recharge is the movement of surface water into the groundwater system. This movement involves infiltration through the air/soil interface and subsequent percolation to the groundwater. It is difficult to separate groundwater recharge from groundwater discharge since both are components of the same system and may occur either simultaneously or consecutively in time. Wetlands play a variable but usually minor role in recharging aquifers. The effectiveness of a wetland depends primarily on topographic or geomorphic position and ability to store and/or detain surface water. Adamus and Stockwell (1983) indicate that the only wetlands that provide significant recharge are those associated with closed basins and wide floodplains with relatively flat surfaces that detain surface runoff. However, the presence of restricting layers (e.g., fine clays) can prevent or hinder groundwater recharge in internally drained basins. Within the GWA II analysis area, marshes, aquatic bed, open water and riverine areas have major value for this function. Areas of wet meadow and mudflat/playa have minor value.

3.2.5.2 Groundwater Discharge

Groundwater discharge refers to the movement of water away from groundwater, usually toward the soil surface and/or toward surface water bodies such as streams, lakes, and ponds.

Groundwater discharge also includes evapotranspirational losses to the atmosphere. One of the important functions of groundwater discharge is to provide a unique wet environment for the establishment, growth, and maintenance of hydrophytic vegetation (Sather and Stuber 1984). Rather than being a function, the wet environment is more of a phenomenon. In other words, the growth and establishment of hydrophytic vegetation is a direct result of groundwater discharge. The most important component of groundwater discharge is streamflow augmentation during the low-flow season (Groenveld and Griepentrog 1985) for perennial and intermittent streams. The project area, however, has little groundwater discharge other than in isolated seeps and springs. As such, marshes provide major value for this function; wet meadows, open water, and riverine areas provide minor value; and aquatic bed and mudflat/playa areas provide minimal to no value.

3.2.5.3 Flood Storage and Desynchronization

Flood storage refers to the process by which peak streamflows are moderated when water overtops channel banks and inundates the area surrounding the stream. The process of flood storage also includes the ability of wetlands to retard overland flow from upland areas. The roughness and friction provided by hydrophytic vegetation detains and stores the flood water for a period of time. Flood desynchronization is the process of simultaneous storage of peak flows in numerous basins within a watershed, and the subsequent, gradual release of flows in a non-simultaneous, staggered manner. Although flood peaks are reduced, the duration of the high flow period is extended.

Both the flood storage and flood desynchronization processes function to reduce flood levels (i.e., the magnitude or attenuate flood peaks) and subsequent flood damage (Larson 1982, Tiner 1984). As such, wetlands function in a manner analogous to flood storage reservoirs. The ability of a wetland to perform these functions depends on the propensity of streamflow to overtop channel banks and flood the surrounding areas, the opportunity of an area to receive and detain overland flow, the size and vertical and horizontal proximity of an area to a river or stream subject to flooding (i.e., topographic and geomorphic position), the type and form of wetland vegetation, and timing of flooding (duration and time of year). The value for this function is minor for areas of wet meadow, aquatic bed, and open water; the value is minimal to minor for mudflat/playas. There is minimal to no value for marshes and riverine areas.

3.2.5.4 Shoreline Anchoring and Dissipation of Erosive Forces

Riparian and wetland vegetation anchors soil material on channel banks and floodplains. Roots bind the soil material, and the above-ground portions of plants provide roughness and friction to slow water flows. These actions protect the soil from the erosive forces of flowing water and from flood flows in particular (Allen 1979; Platts, Gebhardt and Jackson 1985; Carter et al. 1979; Sather and Smith 1984; Windell et al. 1986). Wet meadow wetlands have minor value for this function. All other aquatic habitats have minimal to no value.

3.2.5.5 Sediment Trapping

The ability of a wetland to trap sediment relates directly to its ability to store and desynchronize flood waters; therefore, the discussion presented for flood storage and

desynchronization applies to sediment trapping. The reduction in water velocity due to plant roughness and friction allows sediments to drop out of the water solution. This reduces the sediment load and turbidity of streams and improves the water quality (Mitsch and Gosselink 1986, Larson 1982, Windell et. al. 1986). Wetlands that are subjected to regular flooding and occur in a large, flat area provide the highest functional value. Given the topography, mudflat/playa areas and areas of aquatic bed have major value for this function. Although marsh areas have considerable vegetation (and hence high potential), they have low opportunity to trap sediment and therefore have no to minimal value for this function. All other waters of the U.S. cover types have minimal value for sediment trapping.

3.2.5.6 Nutrient Retention and Removal

In general, wetlands are good filters. Surface waters contain nutrients and pollutants in aqueous solution as well as adsorbed (attached) to sediment particles. As discussed previously, enhanced flood storage and desynchronization detains and slows the movement of surface water. This process, combined with the sediment trapping efficiency of wetland vegetation, causes nutrients to be retained in the wetland and removed from the surface water.

The relatively large number of decomposers (i.e., bacteria and fungi) that occur in wetlands facilitate the retention and breakdown of nutrients and pollutants into forms more usable by higher organisms or into forms that are non-toxic or have reduced toxicity. Further, many wetland plant species uptake nutrients and pollutants, and translocate these substances to their roots, which in turn secrete the substances in the soil. Sediment that is trapped by the wetlands covers and locks such substances into the soil. Therefore, the function of nutrient retention and removal is important in maintaining/improving water quality in water bodies such as streams. Marsh, aquatic bed, and open water areas provide major value for this function. Mudflat/playa areas can provide minor to major value; riverine and wet meadow areas provide minor value for nutrient retention and removal.

3.2.5.7 Food Chain Support

Wetlands are productive communities that can provide diverse types and amounts of food items for both terrestrial and aquatic biotas. The large amount of nutrients, large number of decomposers, high primary productivity, and numerous trophic levels provide diverse and efficient utilization and transfer of nutrients. As such, wetlands are important in providing diversity and ecological richness. Since wetlands are relatively rare in the region, are unique, and are productive, their potential importance to numerous species that depend on these wetlands is high. Marsh and open water areas exhibit primarily major value for this function. All other waters of the U.S. generally provide minor value.

3.2.5.8 Wildlife and Fish Habitat

Wetlands provide required and/or desired habitat for many wildlife species as a result of the variability and diversity provided by the wetland/upland interface or ecotone. Many wildlife species are specifically attracted to edges, interfaces, and ecotones between the wetland and upland environments.

The Wildlife section of the EIS (USDI-BLM 1995) provides greater detail on the importance of wetlands to key wildlife species in the project area. Many avian species utilize the mudflat/playa areas when filled with spring runoff. Species observed include killdeer, ducks, sandpipers, and American avocets. Overall, wetlands and other special aquatic sites within the project area are an ephemeral but important resource for wildlife and birds. Marsh and riverine areas primarily exhibit major value in terms of wildlife habitat and forage. Wet meadow, mudflat/playa, aquatic bed, and open water areas primarily have minor value for wildlife habitat. Since many waters of the U.S. within the GWA II area are ephemeral aquatic environments, their value as fish habitat is non-existent.

3.2.5.9 Heritage and Recreation Values

Wetlands are relatively rare and unique in arid Western regions. The contrast in line, form, color, and texture they create with the surrounding upland vegetation is often considered visually pleasing and interesting. Many people value this distinction. In addition, many people enjoy wetlands as unique biological and physical systems. Wetlands can provide unique educational opportunities. Further, wetlands can offer passive and active recreation opportunities such as sightseeing and bird/wildlife viewing. Such characteristics give wetlands heritage value in the form of visually pleasing landscapes, outdoor recreation opportunities, and unique natural areas. Assessment of this value is highly subjective; it depends on a person's own attitude towards wetlands and the interest one places in the opportunities provided by wetlands. It is also based on the degree of disturbance from their natural state. Within the GWA II analysis area, mudflat/playa areas have no to minimal value for this function except perhaps seasonally when wading birds use is high. For all other waters of the U.S., the value for this function is minimal.

3.3 EXTENT OF VEGETATION COVER TYPE COVERAGE

The primary upland cover type, mixed desert shrub, dominates the analysis area (254,430 acres or 76 percent). There are 63,608 acres or 19 percent of barren land/cushion plant, 6,296 acres or 2 percent of disturbed land (comprised of pipelines, existing drill and well sites, other facilities, etc.), and 6,231 acres or 2 percent of urban land (including roads, railroad, residential and commercial buildings).

The primary wetland cover type is wet meadow (2,069 acres or 0.6 percent), which occurs in areas of internal drainage throughout the analysis area as well as scattered along ephemeral channels where soil saturation occurs for a sufficient length of time to support more hydrophytic species. There is a minor amount of marsh (7 acres, <0.1 percent). Other special aquatic sites include mudflat/playa (748 acres or 0.2 percent) and open water and aquatic bed (612 acres, 0.2 percent). Riverine areas, considered a waters of the U.S. but not a special aquatic site nor a wetland, comprise 190 acres (0.1 percent).

As indicated previously, the wetland cover types may shift from one type to another over the course of the growing season because of the seasonal variability of environmental conditions. As such, the acreages indicated for each cover type are not exact. For example, an area may be aquatic bed in the spring and mudflat/playa or wet meadow later in the growing season. Similarly, open water/aquatic bed areas may develop marsh or wet meadow vegetation.

3.4 PLANT SPECIES OF CONCERN, INCLUDING BLM SPECIAL STATUS PLANTS

As indicated in the Methods section, plant species of concern include 1) species listed as threatened or endangered under the federal Endangered Species Act of 1973, 2) species proposed for federal listing, 3) candidate species under consideration for listing, and 4) other species of concern to the BLM and the WYNDD. Many of these species are also categorized as BLM-designated special status plants, as defined in Section 3.2.

Existing literature (Soil and Land Use Technology 1981, USDI-BLM 1992b) preliminarily identified eleven potential species for the general study area. These included eared rockcress (*Arabis demissa* var. *languida*), precocious milkvetch (*Astragalus proimanthus*), broad-flowered pincushion (*Chaenactis stevioides*), Wyoming tansy mustard (*Descurainia torulosa*), contracted goldenweed (*Haplopappus contractus*), large-fruit bladderpod (*Lesquerella macrocarpa*), contracted ricegrass (*Oryzopsis contracta*), Gibbens penstemon (*Penstemon gibbensii*), Payson penstemon (*Penstemon paysoniorum*), sword townsendia (*Townsendia spatulata*), and Western hop-sage (*Zuckia brandegei*).

Updated inquiries to the WYNDD and the FWS revealed no known threatened or endangered plant species within the analysis area or a township buffer (Davis 1994, Neighbours 1994). However, there were records for four species of concern: broad-flowered pincushion, contracted ricegrass, tiny phacelia (*Phacelia tetramera*), and Western hop-sage. Of these four species, only contracted ricegrass is a BLM special status plant. The BLM subsequently identified nine additional plants species of concern or special status plants for which there are no known sitings within the project area but the plants may occur. These include diffuse sagebrush (*Artemisia biennis diffusa*), Cedar Rim thistle (*Cirsium aridum*), Ownbey's thistle (*Cirsium ownbeyi*), Wyoming tansy mustard, large-fruited bladderpod, Gibbens penstemon, stemless beardtongue (*Penstemon acaulis* var. *acaulis*), Opal phlox (*Phlox opalensis*), and Green River greenthread (*Thelesperma caespitosum*). Table 4 lists these species, their status, and habitat. A Biological Assessment, prepared by Hayden-Wing Associates (HWA 1994), discusses not only the candidate species but also the BLM special status species and species of concern to the WYNDD.

Based on consultation with the FWS and the WYNDD search, Ownbey's thistle, stemless beardtongue, and Green River greenthread are not known to occur within a township buffer around the project area. As such, their occurrence within the GWA II analysis area is therefore unlikely. Diffuse sagebrush, broad-flowered pincushion, large-fruited bladderpod, Gibbens penstemon, tiny phacelia, Opal phlox may possibly occur within the project area in areas of suitable habitat. Cedar Rim thistle and western hop-sage occur in adjacent areas and are likely to occur in areas of suitable habitat within the GWA II area. Contracted ricegrass, which is being recommended for downlisting to 3C status (Amidon 1994), occurs at several locations within the analysis area as well as on adjacent areas of Delaney Rim.

The following descriptions were compiled from various sources: Amidon (1994), Atwood et al. (1991), Clark and Dorn (1979), Davis (1994), Dorn (1977, 1988, and 1992), Fertig (1993 a and b, 1994 a and b), Hartman (1994), Hickman (1993), Holbrook (1993), Read (1994), Spellenberg (1979), Swanson (1994), Unknown (1993), USDI-FS (no date), USDI-BLM (1992 a and b), Welsh et al. (1987), Weynand and Amidon (1990), and WYNDD (1994). The use of various

Table 4. Plant Species of Concern (including BLM Special Status Plants) and Their Status and Habitat Characteristics.[1]

SCIENTIFIC NAME	COMMON NAME	STATUS[2]	HABITAT	PROBABILITY OF OCCURRENCE[3]
Artemisia biennis var. diffusa	Diffuse sagebrush	C2, G5T1, S1, BLM, WYLST 1	clay flats and playas in Sweetwater County, 6,500 ft. Associated vegetation: *Hordeum jubatum* and *Chenopodium glaucum*	possible
Chaenactis stevoides	Broad-flowered pincushion	G3?, S1, WYLST 2	sandy desert areas, 6,000-6,800 ft. Associated vegetation: *Sarcobatus vermiculatus* and *Grayia spinosa*	possible
Cirsium aridum	Cedar Rim thistle	C2, G1, S1, BLM, WYLST 1	barren, chalky hills, gravelly slopes, and silty banks, 6,700-7,100 ft. Associated vegetation: *Phlox bryoides*, *Astragalus kentrophyta*, *A. spatulatus*, *Linum kingii*, *Eriogonum divaricatum*, *Leptodactylon* spp., and *Oryzopsis* spp.	likely
Cirsium ownbeyi	Ownbey's thistle	C2, G3, S1, RS-BLM, WYLST 1	sagebrush-grasslands in and near Flaming Gorge National Recreation Area, 5,500-6,200 ft. Associated vegetation: unknown	unlikely
Descurainia torulosa	Wyoming tansy mustard	C2, G1, S1, RS-BLM, WYLST 1	volcanic scree or very sandy soil at base of north-facing sandstone cliffs, rock crevices, loose talus slopes, 7,600-10,900 ft. Associated vegetation: no strict associates known; *Pseudotsuga menziesii*? and *Populus tremuloides*?	unlikely
Lesquerella macrocarpa	Large-fruited bladderpod	C2, G2, S2, RS-BLM, WYLST 1	sparsely vegetated, loose clay soils of flats, slopes, and hills; 7,000-7,800 ft. Associated vegetation: *Atriplex gardneri*, *Sitanion hystrix*, *Phlox bryoides*, *Cymopterus* spp., and *Lomatium* spp.	possible
Oryzopsis contracta	Contracted Indian ricegrass	C2, G2, S2, RWL-BLM, WYLST 1	plains and hills of western ¾ of state, 6,000 ft. Associated vegetation: *Artemisia tridentata*, *Atriplex* spp., and *Opuntia polyacantha*	likely
Penstemon acaulis var. acaulis	Stemless beardtongue	C2, G3, S1, RS-BLM, WYLST 1	sparsely vegetated, rocky, gravelly hills and ridges and slopes in southern Sweetwater County; 5,000-7,200 ft. Associated vegetation: *Arenaria hookeri*, *Lesquerella alpina*, and *Phlox* spp.	unlikely

Table 4. **Plant Species of Concern (including BLM Special Status Plants) and Their Status and Habitat Characteristics, Continued.[1]**

SCIENTIFIC NAME	COMMON NAME	STATUS[2]	HABITAT	PROBABILITY OF OCCURRENCE[3]
Penstemon gibbensii	Gibbens penstemon	C2, G1, S1, BLM, WYLST 1	sandy or shaley (often Green River Shale) bluffs and slopes, 5,500-7,500 ft. Associated vegetation: *Juniperus* spp., *Cirsium* spp., *Eriogonum* spp., *Elymus* spp., *Amelanchier alnifolia*, *Chrysothamnus* spp., *Thermopsis* spp., *Arenaria* spp., and *Astragalus* spp.	possible
Phacelia tetramera	Tiny phacelia	G4, S1, WYLST 2	sand dune by drainage, heavy soils of bottomlands, 4,400-7,200 ft. Associated vegetation: *Artemisia tridentata*, *Sarcobatus vermiculatus*, *Allenrolfea occidentalis*	possible
Phlox opalensis	Opal phlox	C2, G1, S1, BLM, WYLST 1	semibarren desert grassland on clay and clay-derived soils, 6,300-7,000 ft. Associated vegetation: *Artemisia pedatifida*, *Eriogonum* spp., *Arenaria hookeri*, *Atriplex gardneri*, *Sphaeromeria argentea*	possible
Thelesperma caespitosum	Green River greenthread	C2, G1?, S1, RS-BLM, WYLST 1	rocky ridges. Associated vegetation: unknown	unlikely
Zuckia brandegei	Western hop-sage	G4, S2, WYLST 3	silt loam soils on crumbling shale outcrops in draws, clay soil on north-facing slope with high bluffs, "badlands," 6,800-7,200 ft. Associated vegetation: *Artemisia tridentata* and *Sarcobatus vermiculatus*	likely

1 - Source: Neighbours (1994), Davis (1994), Weynand and Amidon (1990), Fertig (1993a, 1994b), Clark and Dorn (1979)

2 - Definition of status

Federal Status

E Federally Listed Endangered. Species, subspecies, or populations that are threatened with extirpation or extinction resulting from very low or declining numbers, alteration and/or reduction of habitat, detrimental environmental changes, or any combination of the above. Continued long-term survival is unlikely without implementation of special measures.

T Federally Listed Threatened. Species likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

P Federally Proposed for Listing. Species that are proposed for listing as threatened or endangered.

C1 Federal Category 1 Candidate species. Species for which there is substantial information on file on the biological vulnerability and threats to support the appropriateness of proposing to list taxa as an endangered or threatened species.

C2 Federal Category 2 Candidate species. Species for which there is some evidence of vulnerability but for which there are insufficient data to support listing and for which additional study is needed.

3C Federal Category 3C Candidate species. Species that have been found to be more abundant or widespread than had been previously believed, and/or those that are not subject to identifiable threats that place the continued existence of the species at risk.

Table 4. Plant Species of Concern (including BLM Special Status Plants) and Their Status and Habitat Characteristics, Continued.[1]

Global Rank/Definition

G1 Critically imperilled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor of its biology that makes it especially vulnerable to extinction (Critically endangered throughout range).
G2 Imperiled globally because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extinction throughout its range (Endangered throughout range).
G3 Either very rare and local throughout its range or found locally (even abundant at some of its locations) in a restricted range, or because of other factors making it vulnerable to extinction throughout its range (21 to 100 occurrences; Threatened throughout its range).
G4 Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 Demonstrably secure globally, though it may be quire rare in parts of its range, especially at the periphery.

State Rank

S1 Critically imperiled in Wyoming because of extreme rarity (5 or fewer occurrence, or very few remaining individuals) or because of some factor of its biology making it especially vulnerable to extinction (Critically endangered in state).
S2 Imperiled in Wyoming because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extinction throughout its range (Endangered in state).
S3 Rare in Wyoming (on the order of 20+ occurrences) (Threatened in state).
S4 Apparently secure in Wyoming.
S5 Demonstrably secure in Wyoming.

Other Codes

T Rank for a subspecific taxon (species or variety); appended to the global rank for the full species.
? Assigned status questionable.
RWL Recommended for the Watch List for a given resource area of the Bureau of Land Management (PRRA - Platte River Resource Area).
RS Recommended for Federal Sensitive designation.
BLM BLM-identified Special Status Plant.

Wyoming Natural Diversity Database

WYLST 1 Highest priority
WYLST 2 Medium priority
WYLST 3 Lowest priority

3 - Probability based on presence of habitat and known distribution.

technical terms is necessary when describing plants. Readers unfamiliar with such terms should consult the glossary of almost any flora.

3.4.1 Diffuse Sagebrush

Diffuse sagebrush (*Artemisia biennis* var. *diffusa*) is an annual or biennial, tap-rooted sagebrush with low-growing habit. Many similar stems originate from the base of the plant and grow to 3dm high. The inflorescence is dense and spike-like or has spike-like branches; the heads are crowded and not conspicuously peduncled. The leaves are often glabrous or nearly so, and the receptacle is not hairy. Flowers at the middle of the head are fertile, and the ovaries are normal.

This species occurs in clay flats playas in Sweetwater County and is endemic to the Point of Rocks area in Wyoming. This plant is a federal C2 species. Category 2 species are those being

considered for listing as threatened or endangered, but for which more information is needed before a determination can be made. The variety of this plant is critically imperilled throughout its global range although the species itself is demonstrably secure (G5T1). Within Wyoming, the plant is critically imperilled (S1); this plant also occurs on the high priority list (List 1) for the WYNDD.

3.4.2 Broad-flowered Pincushion

Broad-flowered pincushion (*Chaenactis stevoides*), also known as Stevia dusty-maiden or desert pincushion or Esteve's pincushion, is an annual taprooted herb with alternative stem and/or basal leaves. The plant grows from 4 to 43cm tall and branches from the base. Herbage is more or less covered with dense, short, wool-like tangled hairs or at least with cobwebby hairs near the base. Basal leaves in the rosette are generally withering. The leaves are 0.3 to 10cm long, once- to twice-pinnatifid (with lobes to 2.5cm long), and have 4 to 8 pairs of linear to oblong segments. The segments are crowded to well-separated, with the longest near the middle. The tips generally curl. In depauperate specimens, however, the leaves can all be simple. Flowering occurs from March through June. The flowering heads, 6 to 11mm high and 8 to 22mm wide, occur singly to several per stem. Heads are supported by glandular peduncles that are 0.3 to 3cm long. The involucre is obconic to hemispheric, with individual bracts being oblong-lanceolate to linear, acute to shortly acuminate, and glandular at the tips. The white or cream-colored disk flowers are enlarged along the outer edge and appear somewhat ray-like. Flowers may sometimes be tinged with pink. The fruit is seed-like, club-shaped, and hairy. The pappus of the fruit has four lanceolate scales, with the outer scales smaller than the inner.

The range occupied by this plant extends from southeastern Oregon and southern Idaho to western Wyoming and Colorado; south to New Mexico and northwestern Mexico. Within Carbon County, Wyoming, the plant occurs in rocky or sandy desert areas and has been found between 6,000 to 6,800 feet. Associated species have included mat atriplex, shadscale, greasewood, and spiny hopsage. Broad-flowered pincushion has a global rank of G3? (imperilled globally although there are reservations about this assigned status), a state status of S1, and is on the WYNDD List 2 (medium priority).

3.4.3 Cedar Rim Thistle

Cedar Rim thistle (*Cirsium aridum*) is a perennial herb arising from a thick taproot, which is sometimes branched. The plant has alternate, spiny leaves that are reduced upwards as well as spiny basal leaves. Leaf blades are linear elliptic, from 3 to 9cm long and 0.5 to 3cm wide. They are covered with loose tomentum above and are densely white tomentose beneath. Leaf margins are shallowly to deeply pinnately lobed and have spines on the margins 2 to 8mm long. Stem leaves are mostly decurrent for 5 to 20mm. Flowering heads are clustered from 3 to 7 at the apex of the stem. Flowers are 15 to 25mm high and not quite as wide. The involucre is sparsely tomentose to glabrate. The outer phillaries of the involucre are tipped with a yellowish spine. The innermost are often spineless and have a curled tip. The flower itself is lavender and 18mm long. The yellow apical collar on the achenes is lacking.

This plant is endemic to the Wind River and Green River basins in Wyoming. It has been found in the Beaver River/Cedar Rim area of Fremont County as well as in the Green River

Basin in Sublette County. Habitat for this plant includes barren chalky hills, gravelly slopes, and fine textured sandy-shaley draws between 6,700 to 7,200 feet. The plant has C2 federal status. In addition, the plant has a global rank of G1 (critically imperilled throughout its range), a state rank of S1, and is on the high priority list (List 1) for the WYNDD.

3.4.4 Ownbey's Thistle

Ownbey's thistle (*Cirsium ownbeyi*), a perennial herb, occurs in sagebrush, juniper, and riparian communities between 5,500 to 6,200 feet. This plant arises from a caudex and taproot. The plant has rose-pink flowers from late May to August, and the heads do not occur in a terminal cluster unlike may thistles. The involucral bracts are sparingly tomentose along the margins. The stems are winged along the internodes with spiny, decurrent leaf bases. Spines are 3 to 8mm long. Both the stem leaves and the basal rosette of leaves are tripinnatifid, finely divided, and green on both sides. Leaves may be glabrous to sparingly tomentose along the lower side of the midrib. This thistle grows 5 to 7dm high.

This thistle has a global rank of G3, a state rank of S1, and is on WYNDD List 1. The federal status is C2 and the plant is on the recommended sensitive list for the BLM in Sweetwater County, where it occurs in grasslands in and near Flaming Gorge National Recreation Area. The plant also occurs on the east flank of the Uinta Mountains, and in Colorado.

3.4.5 Wyoming Tansy Mustard

Wyoming tansy mustard (*Descurainia torulosa*), a biennial herb with a well-developed taproot, has compound leaves that occur primarily at the base of the fruiting stems. Stems are several to numerous stems and grow 10 to 20cm high. The flowers are yellow and tiny; the fruit is smooth and strongly torulose. Fruits are mostly appressed to the raceme axis and occur on pedicels less than 3mm long.

This plant is endemic to the Absaroka Mountains and Rock Springs Uplift in Fremont, Park, Sweetwater, and Teton counties. In Sweetwater County, Wyoming tansy mustard occurs at Pine Butte. The global distribution is limited to northwestern and south-central Wyoming. This plant grows on sparsely vegetated sandy slopes at the base of cliffs of volcanic breccia or sandstone. The plant flowers in July and August. The fruits mature 3 to 4 weeks later, in August and September. Elevation over which this plant is known to occur ranges from 7,600 to 10,900 feet. There are no known strict vegetative associates. The plant has a federal C2 status, a G1 global status, S1 status for the state, and is on WYNDD List 1. In addition, it is recommended as sensitive by the BLM.

3.4.6 Large-fruited Bladderpod

Large-fruited bladderpod (*Lesquerella macrocarpa*) is found on barren to sparsely vegetated (<5 to 35 percent), loose gypsum-clay soils of hills, benches, and flats in Fremont, Lincoln, and Sublette counties. Its known elevation ranges from 7,000 to 7,800 feet. Associated species include Gardner saltbush, bottlebrush squirreltail, moss phlox, spiny horsebrush, scarlet globemallow (*Sphaeralcea coccinea*), and Indian ricegrass. A careful examination of the soil at a known location near Opal, Wyoming, indicated that the texture was a deep silt loam over fractured, crumbly shale with gypsum deposits. The plant occurred on all aspects. In the

more barren areas, the plant occurred in a microtopographic low position where there was evidence of water flow. Around the more vegetated margins, the plant occurred in intershrub areas, but such areas did not have strong evidence of water flow. The plant did not occur in areas having western wheatgrass or big sagebrush.

This plant is a low-growing, biennial herb endemic to the western edge of the Great Divide Basin and to western Wyoming. The stem and leaves are silvery gray and very hairy. Yellow flowers occur in May and June, with fruiting occurring in June. Mature fruits are needed for positive identification of this plant. This plant has a C2 federal status, global G2 (imperilled throughout its range) and state S2 (imperilled within the state) statuses, and is on WYNDD List 1.

3.4.7 Contracted Ricegrass

Contracted ricegrass (*Oryzopsis contracta*) is a tufted perennial grass 12 to 28 inches tall. This plant has lemmas with long, silky pubescence, but the hairs are about equal to but do not exceed the length of the lemma. The glumes are unequal and 4 to 8mm long. The panicle or flowering portion of the plant is contracted, with the pedicels of the florets parallel to the panicle branches or nearly so--at least initially. The inflorescence often becomes stiffly spreading at maturity. Florets are awned, 6 to 12mm long. Leaves are inrolled and have a rough margin.

This plant occurs on dry, shallow, sandy or gravelly soils on slopes and rolling plains in open, sagebrush-grassland communities in the western three-quarters of Wyoming (Albany, Campbell, Carbon, Converse, Fremont, Hot Springs, Natrona, Park, Sublette, Sweetwater, Teton, and Uinta counties) as well as in southwest Montana and northern Colorado. It has been found at elevations around 6,000 feet. This plant typically occurs on light-colored soils in open areas with low vegetative cover and can be found on all slope aspects (Fertig 1994b). More specifically, this grass has been found on rocky siltstone, saline soils, bentonite, redbeds, limestone gravel, sandstone bedrock, and clay-shale outcrops. Frequently associated species includes Wyoming big sagebrush, needle-and-thread, birdfoot sagebrush, Gardner saltbush, crested wheatgrass (*Agropyron cristatum*), Hooker sandwort, spoonleaf milkvetch (*Astragalus spatulatus*), Indian ricegrass, subalpine needlegrass (*Stipa nelsonii*), woodyaster, and plains pricklypear (Fertig 1994 a and b). According to Fertig (1994b), many populations occur on recently disturbed soils such as roadcuts.

Contracted ricegrass is currently a C2 plant that has been positively identified and collected on Delaney Rim within the analysis area (Holbrook 1993). This grass has been found growing on roadcuts; therefore, minor disturbances may be beneficial or at least neutral to this species. As indicated previously, additional information indicates the plant to be more common than previously thought; it is being recommended for downlisting to 3C status (Fertig 1994b). Contracted ricegrass has a global rank of G4T2 (apparently globally secure but the specific taxon is imperilled globally) and a state rank of S2. In addition, this plant is on the WYNDD List 1.

3.4.8 Stemless Beardtongue

Stemless beardtongue (*Penstemon acaulis* var. *acaulis*), an endemic to southwest Wyoming (Sweetwater County), is known to occur near McKinnon, Wyoming, near the border with Utah. The plant also occurs in northeast Utah, where it grows in pinyon-juniper and sagebrush grass communities on semibarren substrates; it also occurs in northwest Colorado. This plant is a mat-forming perennial herb arising from a fibrous-rooted caudex. The plant lacks flowering stems. Flowers are nestled in the opposite basal leaves that are 4cm high. In outline, the leaf blades are linear or linear-oblanceolate and 3 to 22mm long. The margin is entire and the leaves are generally covered with minute projections. Flowers are blue or bluish-purple, 12 to 16mm long, sessile, and bloom in May and June. As is typical with flowers in the figwort family, the corolla is moderately two-lipped. The throat of the flower is yellow-hairy, and the anthers are glabrous. The sterile filament is bearded with crisp, golden hairs for two-thirds of its length or more. The calyx is 3 to 6mm long and densely glandular-puberulent, the lobes being lance-linear and narrowly acuminate. This plant is more or less stoloniferous.

The habitat exploited by this plant consists of rocky, gravelly, and sparsely vegetated ridges and slopes between 5,000 and 7,200 feet. Associated species include alpine bladderpod, sagebrush phlox, and Hooker sandwort. This plant has a global rank of G3, a state rank of S1, is on WYNDD List 1, and has a Federal status of C2. Additionally, this plant is on the recommended sensitive list for the BLM in Sweetwater County.

3.4.9 Gibbens Penstemon

Gibbens penstemon (*Penstemon gibbensii*) is an erect herbaceous perennial with blue, pubescent (both outside and inside) flowers that are 15 to 20mm long. The stems are usually over 8cm high and sometimes somewhat matted at the base. The sepals are 6 to 8mm long and have moderate to dense glandular hairs on the dorsal surface. Anthers have pubescence on the opposite side of dehiscence. The anther sacs are dark brown or dark purple to black but have a lighter suture margin; they are 1.2 to 1.5mm long. The staminode also has pubescence. Leaves are opposite, linear to linear-lanceolate, and mostly less than 5mm wide. The stem is pubescent nearly to the base.

This plant is endemic to south-central Wyoming as well as northeastern Utah and northwestern Colorado. It grows on sparsely vegetated to barren hills in Sweetwater and Carbon counties. Habitat for this plant is sandy-clay or shaley (often Green River Shale) bluffs and slopes. Associated species include juniper (*Juniperus* spp.), thistle, buckwheat, wildrye (*Elymus* spp.), serviceberry (*Amelanchier alnifolia*), rabbitbrush, and false-lupine (*Thermopsis* spp.). This plant has a federal C2 status, global status of G1, state status of S1, and is on WYNDD List 1.

3.4.10 Tiny Phacelia

Phacelia tetramera, tiny phacelia, is a small annual plant with mostly alternate leaves. The leaves are coarsely toothed and pinnate to less than halfway to the midrib. The leaf shape is oblanceolate and up to 2cm long. The leaves have petioles. The stems of this plant are freely branched, prostrate, and spreading. The stems are covered with minute rough, coarse

stiff hairs. The flowers occur in cymes at the ends of the branches. The parts are in multiples of four (i.e., the plant is 4-merous). The stamens are shorter than or equal to the corolla, which is white or pale yellow. The corolla lobes are entire or nearly so and the corolla is 1 to 2mm long. The seeds are long, pitted, covered with a network of veins, and strongly wrinkled or folded. Flowering occurs in May and fruiting in June. The plant has been collected and/or observed between 4,400 to 7,200 feet.

This plant inhabits sandy desert areas within Sweetwater County, Wyoming. One recorded location was in a sand dune by a drainage at 7,200 feet. The plant was associated with big sagebrush. It has also been observed with pickleweed (*Salicornia* spp.) and greasewood in saline areas. Tiny phacelia is apparently secure globally (G4) but is critically imperilled (S1) in Wyoming. The WYNDD ranks this plant as having medium priority (List 2).

3.4.11 Opal Phlox

Phlox opalensis (*Phlox opalensis*), a perennial plant with white flowers, is endemic to southwestern Wyoming. This plant grows in desert grassland locations in Lincoln, Sweetwater, and Uinta counties and has been found on rocky, relatively barren, clay or clay-derived soils of the Green River Formation. Associated species include Indian ricegrass, stemless goldenweed, Hood's phlox, Gardner saltbush, birdfoot sagebrush, moss phlox, cushion buckwheat, hooker sandwort, and silvery false sagebrush (*Sphaeromeria argentea*). Vegetation is generally sparse (15 to 35 percent). The known elevation range is from 6,300 to 7,000 feet. More careful examination of soils at one known population revealed the texture to be a silt loam to silty clay loam with scattered sandstone and shale platy surface pavements; the soil was skeletal over broken shale bedrock.

The key diagnostic characteristic for Opal phlox appears to be the large flowers, the tube of which is about twice as long as the calyx. Other characteristics include a larger, more erect growth form that is less densely matted; white hyaline (i.e., translucent, papery) internodes and leaf bases; and long crinkly hairs on the leaves (as opposed to somewhat cobwebby hairs or dense wooly hairs of Hoods phlox and moss phlox, respectively). This plant is a federal C2 species, has a global rank of G1, a state rank of S1, and is on the WYNDD List 1.

3.4.12 Green River Greenthread

Green River greenthread (*Thelesperma caespitosum*) is found on rocky, dry ridges in Sweetwater and Uinta counties. Habitats include white shale slopes and ridges. This plant has federal C2 status, global G1? status, state S1 status, and is on the recommended sensitive list in Sweetwater County by the Rock Springs District.

This plant has leaves mostly 1 to 2 times pinnately divided into linear segments. Leaves are mostly towards the base of the plant. The plant's leaves are hairy on the petioles, rarely on the lower blade. The flowers, generally one per stem (rarely two), are usually yellow, and the receptacle is chaffy. The involucre is biseriate, and rays are inconspicuous or lacking. The plant arises from a taproot and branched caudex and typically has many persistent old leaf bases.

3.4.13 Western Hop-sage

Western hop-sage (*Zuckia brandegei*) is a gray-scurfy, unisexual shrub up to 5dm tall and branching from a gnarled woody base. The annual stems are erect or ascending. The leaves, 1 to 8cm long and 1.5 to 4cm wide, are subsessile or taper to a short petiole. The leaf shape is variable: linear or narrowly oblanceolate-spatulate to elliptic, ovate, obovate, or orbicular. The margin of the leaves is typically entire although leaves may on occasion be hastately lobed. Male flowers have a 4- to 5-lobed, strawlike perianth that is cleft to the middle or below. Staminate flowers are nearly 2mm long. In the female flowers, bracts are compressed, with fruits flattened or keeled.

Western hop-sage often occurs on dry hills, often among rocks, as well as on saline and seleniferous substrates. Within Wyoming, this plant occurs on barren clay hills in Carbon and Sweetwater counties and has been associated with big sagebrush and greasewood. Specific findings near the analysis area have been on 1) silt loam soils on crumbling shale outcrops in draws and 2) clay soils of north-facing slope with high bluffs. The elevation of the locations near the analysis area range from 6,800 to 7,200 ft. This plant has also been found along the Duchesne River in Utah. The plant is considered globally secure (G4), state imperilled (S2), and is on the WYNDD List 3 (species downranked as new information became available; includes species rare in Wyoming but common and secure in adjacent areas).

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Direct impacts to vegetation resources would include the short-term loss of vegetation (modification of structure, species composition, and areal extent of cover types). Indirect impacts would include the short-term and long-term increased potential for weed invasion, establishment, and expansion; exposure of soils to accelerated erosion; shifts in species composition and/or changes in vegetative density; reduction of wildlife habitat; and changes in visual aesthetics.

4.2 IMPACT SIGNIFICANCE CRITERIA

The Great Divide Resource Management Plan (RMP) (USDI-BLM 1990a) prescribes the following objectives and actions relative to vegetation and wetlands:

- Using prescribed fire to meet objectives of other programs/improve habitat.
- Enhancing the health, productivity, and diversity of forest land (for this technical report, this objective is assumed to also apply to rangeland as well).
- Maintaining or enhancing populations of plant species of concern. Protecting known populations of plant species of concern, avoiding damage by temporally and spatially managing projects, and using case-by-case examination of proposed surface disturbance activity to determine potential impacts and mitigation.

- Maintaining riparian areas in good or excellent condition or improving areas that are in poor or fair condition.

- Prohibiting surface disturbance within 500 feet of surface water and/or riparian areas.

- Maintaining or improving vegetation condition and/or avoiding long-term disturbance in high priority standard habitat sites and fisheries areas.

The following criteria were used to determine the significance of construction and operation of the proposed project on vegetation resources within the GWA II analysis area. These criteria were developed based on management directives, professional judgement, involvement in other National Environmental Policy Act (NEPA) projects throughout the West, and state regulations (e.g., the Wyoming Noxious Weed Act).

- non-compliance with management directives for the Great Divide Resource Area;

- removal of vegetation such that following reclamation, the disturbed area(s) would not have adequate cover (density) and species composition (diversity) to support pre-existing land uses, including wildlife habitat, within a period of five years for general vegetation types or within two years for riparian and wetland areas;

- introduction and establishment of noxious or other undesirable weedy plants species to the degree that more than 20 percent of a disturbance area resulting from the proposed project is occupied by such species, thereby adversely affecting successful reclamation;

- unauthorized excavation of or discharge of dredged and/or fill materials into waters of the U.S., including special aquatic sites, wetlands, and other areas subject to the federal Clean Water Act, Executive Order 11988 (floodplains) and Executive Order 11990 (wetlands and riparian zones);

- removal or disturbance of plant species of concern (including BLM special status species) and/or habitat judged important for survival to the extent that such impact would threaten the viability of the local population and/or induce an upgrade in the federal, state, or resource area statuses;

- cumulative removal of more than 10 percent of any vegetation cover type within the project-specific GWA II area and/or more than three percent within the cumulative impact area (i.e., watershed of the GWA II analysis area).

4.3 DIRECT AND INDIRECT IMPACTS

4.3.1 Proposed Action

Vegetation removal and soil handling associated with the construction and installation of well pads, pipelines, access roads, and other facilities as outlined in Chapter 2 of the EIS (USDI-BLM 1995) would affect vegetation resources both directly and indirectly. Direct impacts would include the short-term loss of vegetation (modification of structure, species composition,

and areal extent of cover types). Indirect impacts would include the short-term and long-term increased potential for weed invasion, establishment, and expansion; reduction in plant photosynthetic capacity due to coverage by fugitive dust; exposure of soils to accelerated erosion; shifts in species composition and/or changes in vegetative density; reduction of wildlife habitat; and changes in visual aesthetics.

Construction of the Proposed Action would affect 2,416 acres (1,500 acres for well locations and associated facilities, seven acres for the compressor station and 909 acres for combined pipeline/access road rights-of-way, ROWs). Assuming all locations are productive, this area of impact would be reduced (upon successful reclamation) to 1,364 acres (630 acres for well locations, seven acres for the compressor station, and 727 acres for road/pipeline, assuming 10 feet of the 50-foot ROW would be reclaimed). The likelihood of impact is greatest for the mixed desert shrub cover type, which occupies 76 percent of the GWA II analysis area. Except for habitats occupied by plant species of concern, clearing of upland cover types would not be significant because upland cover types are generally abundant and widely distributed throughout the region and/or have been previously impacted (e.g., urban land, disturbed land).

Construction activities, increased soil disturbance, and higher traffic volumes could spur the introduction and spread of undesirable and noxious weed species within the GWA II analysis area. Weed invasion and establishment has become an increasingly important result of previous disturbance (i.e., 12,527 acres) in the GWA II analysis area. Weeds often out-compete desirable species, including species of concern, rendering an area less productive as a source of forage for livestock and wildlife. Additionally, sites dominated by weeds often have a different visual character that may negatively contrast with surrounding undisturbed vegetation. However, with implementation of best management practices and the following three mitigation measures committed to by the area Operators, no significant impacts are anticipated due to weed invasion/establishment:

- Prior to construction, the Operators will submit a Surface Use Plan of Operations or a Plan of Development for each well site, pipeline segment, and access road project. The plan will itemize project administration, time frame, responsible parties, objectives, characteristics of the predisturbance site conditions, topsoil removal, storage and handling, runoff and erosion control, seedbed preparation, seed mixes useful for livestock and wildlife, seed application, fertilization, mulching, site protection, weed and livestock (and other herbivore) control, and monitoring and maintenance. See Appendix B of the *Soils and Water Resources Technical Report* (ECOTONE 1995) for reclamation recommendations to be used in preparing for these plans as well as recommendations for monitoring revegetation efforts.

- Seed and stabilize disturbed areas with seed mixtures and treatment measures recommended in Appendix B of the *Soil and Water Resources Technical Report* (ECOTONE 1995). This measure ensures revegetation with desirable plant species designed to provide immediate stabilization, prevent invasion of noxious weeds, and reduce over-competition in order to preclude the recolonization of native species.

- Design a noxious weed monitoring program and implement, if necessary, a weed control and eradication program per BLM requirements. This measure allows early identification of undesirable species and reduces the potential negative impacts of such species.

Fugitive dust generated during project construction and operation could adversely affect vegetation, including plant species of concern, due to the reduction in photosynthetic capacity of dust-covered leaves. Although such deposition could have adverse effects, the magnitude of such an impact would likely be minimal since wind and rain remove dust on leaves, a relatively small area in close proximity to the dust source is affected, and fugitive dust control has been adopted by the BLM and operators.

- When fugitive dust is identified as a problem, immediate abatement will be initiated. The BLM will approve the procedure (e.g., application of water and magnesium chloride) for dust abatement at facility construction sites as well as locations for use and application rates. Water, if approved for this purpose, must be obtained by the Operator from State-approved source(s).

Potential impacts to waters of the U.S., including wetlands and other special aquatic sites, could include clearing, excavating, filling, and grading. Such impacts would reduce the area and functional values offered by an affected cover type. Specific project impacts on waters of the U.S. cannot be accurately assessed since facility locations have not been identified at this time. However, waters of the U.S. comprise less than 1.5 percent of the GWA II analysis area and their occurrence is not contiguous. Given this, well sites would be located to avoid wetlands. Road and pipeline facilities, however, might affect a small amount (estimated <5 acres) of wetlands where such facilities cannot be located to avoid wetlands.

The probability of the Proposed Action causing significant impacts to waters of the U.S. is low given compliance with the RMP, the CWA, and Executive Orders 11990 and 11988 as well as by implementation of the following measures as committed to by the Operators:

- Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a 500-foot-wide buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels and wetlands. This measure reduces the potential for slope-related failures and the likelihood of migration of additional sediment into channel courses.

- Well sites, access roads, and pipelines will not be constructed within 500 feet of surface water, wetlands and/or riparian areas. Exceptions to this will be granted by the BLM based on an environmental analysis and site-specific mitigation plans.

- Evaluate all project facility sites in close proximity to wetland areas shown on Map 1 for the occurrence and distribution of waters of the U.S., including special aquatic sites and jurisdictional wetlands. All project facilities will be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations of facilities. Coordinate with the COE all activities that involve excavation of or discharge of dredge/fill into wetlands. This measure

ensures compliance with the CWA, minimizes disturbance, and assures proper mitigation for waters of the U.S. protected under that act.

Road and pipeline crossings of waters of the U.S. would likely be authorized under COE Nationwide Permits 12 (pipelines), 14 (roads), 18 (minor discharge), or 26 (discharge into headwaters). Compliance might involve compensatory mitigation for affected wetlands if such areas cannot be avoided. This topic is further addressed in the Mitigation discussion.

Management directions emphasize the need to protect plant species of concern. Surface disturbing activities could affect plant species of concern directly and indirectly by destroying individuals or their habitat, increasing the amount of fugitive dust, and introducing weeds. As plant species of concern in desert areas often exploit unique and/or harsh environments (e.g., cliffs, rocky talus slopes, and barren or semi-barren windswept ridges and slopes), Delaney Rim and areas supporting the barren/cushion plant cover type have the highest potential for the occurrence of plant species of concern and/or habitat, although sandy areas, playas, and mixed desert shrub have variable potential. Barren/cushion plant areas comprise 19 percent of the GWA II analysis area; potential habitat areas other than mixed desert shrub comprise around one percent of the GWA II analysis area.

With compliance of RMP management directives, mitigation committed to by the Operators (see bulletted item below), and implementation of mitigation recommended in Section 4.6 of this technical report, no significant impacts to plant species of concern are anticipated under the Proposed Action.

- Per BLM directives, a site-specific survey for special status plants and their habitat would be conducted for each facility-specific development where deemed necessary by the BLM prior to initiation of any ground-surface disturbance. If found, minimize and monitor impacts to plant species of concern. Make minor adjustments to the location of project facilities to avoid plant species of concern and/or their habitat. This measure ensures that plant species of concern plants will be discovered and, if present, ensures protection.

4.3.2 Alternative A

Fewer acres of construction impacts (1,250 acres for well locations, seven acres for the compressor station, and 758 acres for road/pipeline ROW, for a total of 2,015 acres) would occur to all cover types, including wetlands and other special aquatic sites, under Alternative A. Production phase impacts would be 525 acres for well locations, seven acres for the compressor station, and 606 acres for road/pipeline ROW, for a total of 1,131 acres. As with the Proposed Action, the amount and duration of such impacts would depend on the locations of the wells and access roads. However, the majority of this impact would occur in the mixed desert shrub and barren/cushion plant cover types. Direct and indirect impacts to waters of the U.S. and to plant species of concern and their habitat are not specifically known as facility locations have not been identified for the EIS. However, impacts would likely be lower than for the Proposed Action given the lesser area of land that would be affected. The stipulations prescribed in the RMP (USDI-BLM 1990a) and measures committed to by the Operators (Chapter 2 of the EIS) would preclude significant impacts to vegetative resources.

4.3.3 Alternative B

Alternative B would affect 1,000 acres for well locations, seven acres for the compressor station, and an additional 606 acres for road/pipeline ROWs, for a total impact of 1,613 acres during project construction. With reclamation, production phase impacts would be reduced to 420 acres for well locations, seven acres for the compressor station, and 484 acres for road/pipeline ROWs for a total of 911 acres. Again, the majority of this impact would occur in upland cover types, most specifically in areas of mixed desert shrub and barren/cushion plant. Fewer waters of the U.S. would be affected under this alternative than under the Proposed Action or Alternative A. The exact amount would depend on the locations of the road/pipeline ROWs. Direct and indirect impacts to plant species of concern and their habitat are unknown for the well locations. However, given the stipulations prescribed in the RMP (USDI-BLM 1990a) and measures committed to by the Operators (EIS Chapter 2), no significant impacts are expected to vegetative resources under this alternative.

4.3.4 Alternative C - No Action

Under the No Action Alternative, vegetation would continue to be impacted as applications for permits to drill (APDs) are granted by the BLM. Loss of upland cover types would not be significant. If present, impacts to wetlands would be assessed and mitigated on a case-by-case basis similar to the Proposed Action and action alternatives. Rare plant surveys would continue to be performed prior to earth-surface disturbance activities associated with individual projects. Noxious weed programs would be implemented per stipulations in individual APDs.

4.4 IMPACTS SUMMARY

During construction, implementation of the Proposed Action and action alternatives (A and B) would initially affect 2,416 acres, 2,015 acres, and 1,613 acres of various vegetation cover types, respectively. Reclamation efforts during well production would reduce respective impacts to 1,364 acres, 1,131 acres, and 911 acres, respectively.

Impacts to vegetation would include removal of cover types (potential to decrease diversity and density of desirable species) and the increased potential for noxious weed invasion and establishment. Associated effects of such loss on wildlife, visual resources, and land use are discussed under those headings. Except for waters of the U.S. (including wetlands and other special aquatic sites) and/or plant species of concern and their habitat, a reduction in vegetation density would not be significant because upland vegetation types are relatively common, cover large areas, have wide distribution, and occur with high frequency within the project area as well as on other lands within the Great Divide and Washakie basins. (See cumulative impacts for a discussion on the impact to vegetation cover types relative to existing disturbance in the GWA II analysis area and to projects within this larger context area.)

Monitoring for invasion and establishment of weeds and prompt and aggressive remediation would prevent further weed invasion/establishment problems and facilitate successful revegetation of disturbed areas.

Project implementation could potentially impact the area and functions of wetlands, special aquatic sites, and other waters of the U.S. Direct impacts could occur through filling, grading, and excavation; indirect impacts could occur through hydrologic modification, sedimentation, pollution, and disturbance. Due to the larger area of disturbance associated with road/pipeline ROW facilities, the Proposed Action would be more likely to affect waters of the U.S. than the other alternatives. However, measures imposed by the RMP (USDI-BLM 1990a) and the 404 permitting process would prevent or avoid impacts to jurisdictional wetlands and other special aquatic sites. Further, compliance with Section 404(b)(1) guidelines would remove the potential for significant impacts under all alternatives.

All alternatives have potential to affect plant species of concern or habitat for such species. Due to their unlikely potential occurrence within the project area, the proposed alternatives "will not affect" the following species or their habitat: Ownbey's thistle, Wyoming tansy mustard, stemless beardtongue, and Green River greenthread. Diffuse sagebrush, broad-flowered pincushion, large-fruited bladderpod, Gibbens penstemon, tiny phacelia, Opal phlox may possibly occur within the project area. Cedar Rim thistle and western hop-sage are likely to occur. If such plants are found during clearance surveys of areas slated for construction, the plants could be affected by the proposed alternatives. Such an effect would be particularly likely in the area of Delaney Rim. However, with implementation of the described mitigation measures, including close communication with and guidance from the FWS, the proposed alternatives may affect but are "not likely to adversely affect" these species or habitat. Contracted Indian ricegrass is known to occur in the project area and has been found growing on roadcuts. Thus, minor disturbance may be beneficial or at least neutral to this grass. As such, construction of the proposed alternatives may affect but would not adversely affect the species or its habitat. Therefore, provided that the described mitigation measures are implemented, the proposed alternatives are not expected to impact plant species of concern to the extent that such impact would threaten the viability of the local population and/or induce an upgrade in the federal, state, or resource area statuses.

The duration and magnitude of impacts to vegetation cover types would depend on the locations of well sites and access roads, the success of mitigation and revegetation efforts, and the time needed for natural succession to return revegetated areas to predisturbance conditions. The latter may be on the order of 20 to 30 years for the mixed desert shrub community type. Revegetation success would depend on the amount and quality of topsoil salvaged, stockpiled, and respread over disturbed areas as well as weed control efforts.

Reclamation would be accomplished according to a site-specific reclamation and revegetation plan that uses best-management practices. Revegetation would involve the use of plant materials that meet specific reclamation objectives in terms of soil erosion control; soil protection, stabilization, and fertilization; aesthetics; and compatibility with native vegetation adjacent to the disturbance area. In spite of the poor reclamation potential for many soils (see discussion in the *Soils and Water Resources Technical Report* [ECOTONE 1995]), technology exists to return disturbed areas to predisturbance conditions in the time frame indicated by the significance criteria.

4.5 CUMULATIVE IMPACTS

The GWA II analysis area (334,191 acres) comprises approximately one third of the cumulative impact analysis (CIA) area (1,114,630 acres). As mentioned in Section 2.4, a detailed analysis of existing disturbance within the GWA II analysis area and the CIA area is presented in the *Soils and Water Resources Technical Report* (ECOTONE 1995). Existing disturbance within the GWA II analysis area is 12,527 acres, or around 3.7 percent of the 334,191-acre project area. Colorado Interstate Gas's Uinta Basin Lateral pipeline project occurs in the GWA II field area, as does the Echo Springs Gas Gathering System; therefore, impacts associated with those projects are included in the existing disturbance of the GWA II analysis area.

During the construction phase, the Proposed Action would add 2,416 acres of impact for a cumulative area of 14,943 acres (4.5 percent). Alternative A would increase existing disturbance by 2,015 acres to 14,542 acres (4.4 percent). Alternative B would produce 1,613 acres of new impact for a total of 14,140 acres (4.2 percent). Under Alternative C, additional surface disturbance would occur on a case-by-case basis. It is anticipated that such impact would be between 3.7 and 4.5 percent of the GWA II analysis area. Impacts within the GWA II analysis area would be reduced upon reclamation of pipeline ROWs and unused portions of the drill pads during the production phase for each alternative. Under the Proposed Action, reclamation would reduce impacts by 1,052 acres to 1,364 acres for a cumulative impact of 4.2 percent of the GWA II analysis area. Alternative A impacts would decrease by 877 acres to 1,138 acres, with cumulative impacts affecting 4.1 percent of the GWA II analysis area. Alternative B impacts would drop by 701 acres to 912 acres; therefore, cumulative impacts would drop to 4.0 percent of the GWA II analysis area. Impacts under Alternative C would decrease by approximately 2.9 acres per well site and roughly 80 percent of the area associated with road/pipeline ROWs. The cumulative effect, however, is anticipated to be between 3.7 and 4.3 percent of the GWA II analysis area.

The geographic area outside of the GWA II analysis area but within the CIA area contained approximately 4,403 acres of existing disturbance as of 1985, or 0.6 percent of the 780,440-acre area beyond the GWA II analysis area. Correcting for current disturbance using an environmentally conservative approach (i.e., overestimating the amount of disturbance), the true magnitude of existing disturbance is probably around 8,806 acres. Therefore, the total existing disturbance would be approximately 21,333 acres, or 1.9 percent of the 1,114,630 acre-CIA area. Impacts due to the Proposed Action would be approximately 2,416 acres. This, combined with the existing disturbance in the CIA, would be approximately 23,749 acres or 2.1 percent of 1,114,630 acres. Impacts due to the other alternatives would affect a smaller percentage of the CIA area.

Additional oil and gas development in the future (i.e., beyond that proposed in the EIS) within the CIA area could engender cumulatively significant impacts. However, as no specific projects other than the GWA II have been proposed at this time, the cumulative effects from possible future development projects must be addressed in environmental documents prepared specifically for those projects. Such environmental documents would tier to the cumulative evaluation in this technical report to determine if the proposed projects would produce cumulatively significant effects on vegetation resources.

Based on the impact significance criteria presented in Section 4.2 and with application of mitigation measures identified in Section 4.6, in Chapter 2 of the EIS (USDI-BLM 1995), and in the *Soils and Water Resources Technical Report* (ECOTONE 1995), the loss of vegetation, whether due to soil disturbance, increases in fugitive dust, or increase in competition with weedy species, would not be cumulatively significant for either the GWA II analysis area or the CIA area. The possible exceptions to this statement would be the potential losses of water of the U.S. and plant species of concern or habitat. Cumulative negative impacts to wildlife due to habitat loss or habitat avoidance due to human-caused factors are discussed in the Wildlife section of the EIS.

Any unpermitted impact to waters of the U.S. associated with this project or other projects in the vicinity or region would add to the cumulative loss of these important areas. The historical loss of wetlands in the U.S. has been well documented as a major environmental problem. The total area of wetlands loss in the U.S. (lower 48 states) is not accurately known but is believed to exceed 90,000,000 acres--nearly half the estimated original base. Of this total, 87 percent was due to agricultural conversion, eight percent due to urban development, and five percent due to other causes including mining and transportation (Dahl and Pywell 1989). Within Wyoming, there has been an approximate 38 percent loss of wetlands. A COE-approved Section 404 permit with requirements of avoidance of waters of the U.S., including special aquatic sites and wetlands, and proposed and recommended mitigation measures would remove the potential for significant cumulative impacts to these sensitive areas.

No significant cumulative impacts to plant species of concern or their habitat are anticipated for the Proposed Action or alternatives with implementation of mitigation measures proposed by the Operators and those recommended in this document. If executed in a timely manner, such measures would identify the locations of individuals/potential habitat of plant species of concern prior to earth-surface disturbance. The BLM, in close coordination with the FWS, would then determine specific measures to preclude significant impacts, both on a project level and on a cumulative level. Also, the measures would hinder the establishment and spread of noxious weeds, which could indirectly affect the survivorship of plant species and the quality of potential habitat.

4.6 MITIGATION SUMMARY

Mitigation measures committed to by the Operators include site-specific recommendations being developed by an interdisciplinary team (IDT) for staked facilities; preparation of surface use plans; minimization of impacts due to clearing and soil handling; implementation of adequate erosion control measures; reseeding and site rehabilitation; noxious weed monitoring and control/eradication per BLM policy; compliance with Section 404(b)(1) guidelines of the federal CWA; and clearance surveys for plant species of concern. See the EIS (USDI-BLM 1995) for further discussions of these measures.

By way of clarification, weed monitoring should occur for species identified by the State of Wyoming as well as for additional species specified by each county during a given year. Such species comprise the official list of weeds for which a county can cost-share funding for control and removal efforts.

Although not specifically stated in the RMP, surface disturbance should be prohibited within 500 feet of jurisdictional wetland areas--not only surface waters and/or riparian areas--and wetlands should be maintained in good or excellent condition or improved in areas that are in fair to poor condition.

During the planning/construction phase, Map 1 should be used to indicate the potential presence of wetlands for each project facility. If the map indicates that a proposed facility would occur on or near a wetland area, site-specific investigations for wetlands are warranted. As part of compliance with Section 404(b)(1) guidelines of the CWA, the location and extent of areas meeting all three parameters of jurisdictional wetlands should be identified and delineated prior to earth-surface disturbance. Also, the regulatory status of each site-specifically delineated area should be determined during an onsite review and possible avoidance/mitigation strategies investigated.

If wetlands occur at the site of a proposed facility, project planning should include wetlands avoidance. If total avoidance is not possible, then the project should be designed to minimize adverse impacts (e.g., location of drill/well site shifted away from wetland or pad configuration modified to reduce impacts). Compensatory mitigation would be required for above-ground facilities that would affect jurisdictional wetlands. The Operators must contact the COE to determine the specific 404 permit conditions (including compensatory mitigation) for each facility to prevent the occurrence of significant impact to waters of the U.S.

Based on the likelihood of occurrence, impacts to plant species of concern are possible. To adequately evaluate impacts, on-the-ground clearance surveys should be performed for plant species of concern identified by the WYNDD, FWS, and BLM. Such species include those listed as threatened or endangered, those proposed for listing, those that are candidate Category 1 and 2 species for federal listing, and those that are BLM special status plants. *As species may be added to or deleted from the list identified in this technical report due to the influx of additional data, these organizations should be contacted for the most current list of species prior to performing surveys.* Surveys would be conducted for site-specific areas designated by the BLM once the location(s) of project facilities becomes known. Surveys should be conducted during the appropriate flowering/fruiting season for each species of concern. Personnel with the BLM, FWS, or WYNDD should be contacted to determine how plant phenological stages are progressing for a given year.

If plant species of concern are located during clearance surveys, the BLM would determine the appropriate mitigation measures necessary to eliminate/minimize potential adverse impacts. The FWS will be consulted for developing the best mitigation approaches to prevent significant impacts. If mitigation cannot be developed sufficient to prevent significant impacts, the BLM can refuse an APD for the specific site of concern.

No further measures beyond compliance with the RMP (USDI-BLM 1990a), the measures in Chapter 2 of the EIS, the BLM's Wyoming Policy on Reclamation (USDI-BLM 1990b), and recommended measures in this section as well as measures recommended for Soils, Water Resources, and Visual Resources would be required to prevent significant impacts.

4.7 RESIDUAL IMPACTS

No significant unavoidable adverse residual impacts to vegetation resources would occur with implementation of mitigation stipulations in the RMP and measures proposed by UPRC although successful revegetation within three to five years would be difficult for some cover types. Revegetation to "predisturbance" conditions would require 30 years or more; however, this lag would not be significant provided substantial erosion or other significant environmental impacts do not occur during this long-term period.

Construction of the proposed project would involve clearing vegetation within the GWA II analysis area. Such loss of vegetation would be irretrievable. The loss could be partially reversible through revegetation of cut-and-fill slopes; however, some areas (e.g., destabilized sand dunes) may be particularly difficult to reclaim and could constitute an irreversible commitment of resources even with best management practices. Loss of species of concern or their habitat would also be an irreversible and irretrievable commitment of resources.

Potential impacts to waters of the U.S., including wetlands and other special aquatic sites, would be both reversible and retrievable through avoidance, impact minimization, and comprehensive compensatory mitigation that would ensure replacement of lost area and functional values of these sensitive cover types. If wetlands are impacted, the implementation of compensatory mitigation prior to project construction would reduce the potential for irretrievable impacts.

5.0 REFERENCES CITED

Adamus, P.R. 1983. *A Method for Wetland Functional Assessment. Vol. I.* Offices of Research, Development and Technology; Fed. Highway Admin., Dept. of Transp. Report No. FHWA-IP-82-23. 171 pp.

Adamus, P.R.; E.J. Clarain, Jr., R.D. Smith, and R.E. Young. 1987. *Wetland Evaluation Technique (WET); Volume II: Methodology.* Operation Draft Technical Report Y-87-__. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. 206 pp. plus appendices.

Adamus, P.R. and L.T. Stockwell. 1983. *A Method for Wetland Functional Assessment.* Offices of Research, Development and Technology, Federal Highway Administration, Department of Transportation, Report No. FHWA-IP-82-23. 138 pp.

Allen, H.H. 1979. Role of Wetland Plants in Erosion Control of Riparian Shorelines. pp. 403-414 in P.E. Greeson, J.R. Clark, and J.E. Clark (Eds.). *Wetland Functions and Values: The State of Our Understanding.* Amer. Water Resources Assoc.

Alley, H.P. and G.A. Lee. 1979. *Weeds of Wyoming.* Univ. Wyoming Agric. Expt. Sta. Bull. 498. Laramie, WY. 120 pp.

Amidon, B. 1994. Botanist, Rock Springs District. Personal communication with J. Crane and O. Grah, ECOTONE Environmental Consulting, Inc., Logan, UT, on 10 June, 24 July, 14 September, and 19 September regarding various plant species of concern.

Atwood, D., J. Holland, R. Bolander, B. Franklin, D.E. House, L. Armstrong, K. Thorne, and L. England. 1991. *Utah Endangered, Threatened and Sensitive Plant Field Guide.* U.S. Department of the Interior - Forest Service, Intermountain Region Ogden, UT; National Park Service, UT; Bureau of Land Management, Salt Lake City, UT; Utah Natural Heritage Program, Salt Lake City, UT; U.S. Fish and Wildlife Service, Salt Lake City, UT; Environmental Protection Agency Region 8, Denver, CO; Navajo Nation, Navajo Natural Heritage Program, Window Rock, AZ; and Skull Valley Goshute Tribe, Salt Lake City, UT. Variously paged.

Carbon County Weed & Pest District. 1994. Larry Justesen, Supervisor. Personal communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 24 February and 23 June 1994 and written communication on 4 April 1994 regarding designated noxious weeds in Carbon County.

Carter, V., M.S. Bedinger, R.P. Novitzki, and W.O. Wilen. 1979. Water Resources and Wetlands. pp. 344-376 in P.E. Greeson, J.R. Clark, and J.E. Clark (Eds.). *Wetland Functions and Values: The State of Our Understanding.* Amer. Water Resources Assoc.

Clark, T.W. and R.D. Dorn. 1979. *Rare and Endangered Vascular Plants and Vertebrates of Wyoming.* 78 pp.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classifications of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-79/31. Washington, D.C. 104 pp.

Dahl, T. and R. Pywell. 1989. National Status and Trends Study: Estimating Wetland Resources in the 1980s. in *Proceedings of the Symposium on Wetlands: Concerns and Successes*. September 17-22, 1989, Tampa, FL. The American Water Resources Association, Bethesda, MD.

Davis, C.P. 1994. State Supervisor, Wyoming State Office, U.S. Department of the Interior, Fish and Wildlife Service. Written communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 18 January 1994 regarding update on wildlife and plant species of concern.

Dorn, R.D. 1977. *Manual of the Vascular Plants of Wyoming*. 2 vols. Garland Publishing, Inc., New York & London. 1,498 pp.

-----. 1988. *Vascular Plants of Wyoming*. Mountain West Publ. Cheyenne, WY. 340 pp.

-----. 1992. *Vascular Plants of Wyoming*. Second Ed. Mountain West Publ. Cheyenne, WY. 340 pp.

ECOTONE Environmental Consulting, Inc. (ECOTONE). 1995. *Soils and Water Resources Technical Report for the Greater Wamsutter II EIS Project.* Unpublished report prepared for UPRC, other area Operators, and the Bureau of Land Management. ECOTONE Environmental Consulting, Inc., Logan, UT. (in preparation).

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Tech. Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MI, 100 pp. plus apps.

Fertig, W. (Compiler). 1993a. Wyoming Plant Species of Special Concern, May 1993. Wyoming Natural Diversity Database, Laramie, WY. 19 pp.

-----. 1993b. Heritage Botanist, Wyoming Natural Diversity Database. Written communication with B. Amidon, Rock Springs District BLM, Rock Springs, WY, on 24 March 1993 regarding *Oryzopsis contracta*.

-----. 1994a. Status Report on *Oryzopsis contracta*, A USFWS Category 3 Candidate Species. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY. 41 pp.

-----. 1994b. Wyoming Candidate, Threatened, Endangered, and Sensitive Plants. 1994 WY Rare Plant Conference, Riverton, WY. Variously paged.

Groenveld, D.P. and T.E. Griepentrog. 1985. Interdependence of Groundwater, Riparian Vegetation, and Streambank Stability: A Case Study. pp. 44-48. in R.R. Johnson, C.D. Ziebell, D.R. Patton, P.F. Ffolliott, and R.H. Hamre (Tech. Coords.). *Riparian Ecosystems and Their Management: Reconciling Conflicting Uses.* U.S. Department of Agriculture. For. Serv. Gen. Tech. Rep. RM-120. Rocky Mtn. For. and Range Expt. Sta., Fort Collins, CO.

Hartman, R. 1994. Curator, Rocky Mountain Herbarium, Department of Botany at University of Wyoming, Laramie, WY. Personal and written communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 14 June and 22 June 1994 regarding plant species of concern.

Hayden-Wing Associates (HWA). 1994. *DRAFT Biological Assessment: Threatened, Endangered, and Candidate Wildlife Species and Sensitive Plant Species.* Greater Wamsutter Area II Natural Gas Development Project. Unpublished document prepared for the U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area and for Gary Holsan Environmental Planning.

Hickman, J.C. (Editor). 1993. *The Jepson Manual: Higher Plants of California.* University of California Press, Los Angeles. 1,400 pp.

Holbrook, B. 1993. Area Manager, Great Divide Resource Area. Personal communication with G. Holsan, Holsan Environmental Planning, Thayne, WY, on 7 April 1993.

Holmgren, A.H. and B.A. Anderson. 1971. *Weeds of Utah.* Utah State Univ. Agric. Expt. Sta. Spec. Rep. 21, Logan, UT. 115 pp.

James, L.F. and R.F. Kaller. 1980. *Plants Poisonous to Livestock in the Western United States.* U.S. Department of Agriculture, Agric. Info. Bull. No. 415. 90 pp.

Kollmorgen Corp. 1988. Munsell Soil Color Chart. Kollmorgen Instruments Corporation, Baltimore, MD.

Larson, J.S. 1982. Wetland Value Assessment -- State of the Art. pp. 417-424 in Gopal et al. (Eds.). *Wetlands: Ecology and Management.* Natural Institute of Ecology and International Scientific Publications, Jaipur, India.

Lowham, H.W., D.A. Peterson, L.R. Larson, E.A. Zimmerman, B.H. Ringen, and K.L. Mora. 1985. *Hydrology of Area 52, Rocky Mountain Coal Province, Wyoming, Colorado, Idaho, and Utah.* U.S. Geological Survey, Water-Resources Investig. Open-File Rep. 83-761. Cheyenne, WY. 96 pp.

Mitsch, W.J. and J.G. Gosselink. 1986. Values and Valuation of Wetlands. Chapter 15, pp. 393-414 in *Wetlands.* Van Nostrand Reinhold, New York. . 539 pp.

Neighbours, M.L. 1994. Information Manager, Wyoming Natural Diversity Data Base, The Nature Conservancy. Written communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 14 January 1994 regarding update on wildlife and plant species of concern.

Nelson, J.R. 1986. Rare Plant Surveys: Techniques for Impact Assessment. Natural Areas J. 5(3):18-30.

Peter, C. 1994. Regulatory Specialist, Department of Army Corps of Engineers, Omaha District, Wyoming Field Office, Cheyenne, WY. Personal communication with O. Grah, ECOTONE Environmental Consulting Inc., Logan, UT, during July 1994.

Platts, W.S., K.A. Gebhardt, and W.L. Jackson. 1985. The Effects of Large Storm Events on Basin-Range Riparian Stream Habitats. pp. 30-34 in R.R. Johnson, C.D. Ziebell, D.R. Patton, P.F. Ffolliott, and R.H. Hamre (Tech. Coords.). *Riparian Ecosystems and Their Management: Reconciling Conflicting Uses.* U.S. Department of Agriculture. For. Serv. Gen. Tech. Rep. RM-120. Rocky Mtn. For. and Range Expt. Sta., Fort Collins, CO.

Read, M. 1994. Wildlife Biologist, Bureau of Land Management, Great Divide Resource Area. Personal communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 17 June and 21 July 1994 regarding plant species of concern.

Reed, P.B., Jr. 1988. *National List of Plant Species that Occur in Wetlands: Northwest (Region 9).* U.S. Fish Wildl. Serv. Biol. Rep. 88(26.9). 89 pp.

Reed, P.B. Jr. 1993. 1993 Supplement to National List of Plant Species that Occur in Wetlands: Northwest (Region 9). Supplemental Report prepared in cooperation with D. Peters, U.S. Fish and Wildlife Service; J. Goudzwaard, U.S. Army Corps of Engineers; I. Lines, U.S. Soil Conservation Service; and F. Weinmann, U.S. Environmental Protection Agency. 12 pp.

Sather, J.H. and R.D. Smith. 1984. *An Overview of Major Wetland Functions and Values.* U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-84/18. 70 pp.

Sather, J.H. and P.J.R. Stuber (Technical Coordinators). 1984. *Proceedings of the National Wetland Values Assessment Workshop, May 23-26, 1983, Alexandria, Virginia.* U.S. Department of the Interior, Fish and Wildlife Service. FWS OBS-84/12. 100 pp.

Soil and Land Use Technology. 1981. *Soil Inventory of the Overland Area, Wyoming.* Volumes I and II. In-house information prepared for the U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins District. Rawlins, WY. 417 pp. and 301 pp.

Spellenberg, R. 1979. *The Audubon Society Field Guide to North American Wildflowers: Western Region.* Alfred A. Knopf, New York. 862 pp.

Swanson, K. 1994. Area Manager, Bureau of Land Management, Great Divide Resource Area. Written communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 20 December 1994 regarding plant species of concern.

Sweetwater County Weed & Pest District. 1994. Ralph Simnacher, Supervisor. Personal communication with J. Crane, ECOTONE Environmental Consulting, Inc., Logan, UT, on 24 February 1994 regarding the Designated List.

Texas Resource Consultants (TRC). 1982. *Soil Inventory of the Overland Area, Wyoming.* In-house information prepared in cooperation with the Soil Conservation Service for the Bureau of Land Management, Great Divide Resource Area, Rawlins District. Rawlins, WY. 605 pp.

Tiner, R.W. Jr. 1984. *Wetlands of the United States: Current Status and Recent Trends.* National Wetlands Inventory, U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 59 pp.

U.S. Department of Agriculture - Forest Service (USDI-FS). No date. *Idaho and Wyoming Endangered and Sensitive Plant Field Guide*. U.S. Department of Agriculture, Forest Service, Intermountain Region, Ogden, UT. 192 pp.

U.S. Department of the Interior - Bureau of Land Management (USDI-BLM). 1975-1980. Sweetwater County Map Unit Descriptions. U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins District, Rawlins, WY. In-house information on soil map units. Variously paged.

----- (USDI-BLM). 1978. Carbon County Map Unit Descriptions. U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins District, Rawlins, WY. In-house information on soil map units. Variously paged.

_____ (USDI-BLM). 1982. *Sodium Mineral Development Final Environmental Assessment.* U.S. Department of the Interior, Bureau of Land Management, Rock Springs District, Rock Springs, WY. WY-049-EA81-8. Variously paged.

----- (USDI-BLM). 1985. *Kemmerer Resource Management Plan Draft Environmental Impact Statement.* U.S. Department of the Interior, Bureau of Land Management, Kemmerer Resource Area. BLM-WY-85-002-4410. 315 pp.

----- (USDI-BLM). 1987. Albany County Soil Survey. U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins District, Rawlins, WY. In-house information on soil map unit descriptions. Variously paged.

_____ (USDI-BLM). 1990a. *Great Divide Resource Area Record of Decision and Approved Resource Management Plan.* U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area, Rawlins, WY. 74 pp.

_____ (USDI-BLM). 1990b. Wyoming Policy on Reclamation. U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Rawlins, WY. Dated 2 February 1990.

_____ (USDI-BLM). 1992a. *Environmental Assessment for the Proposed Uinta Basin Lateral Natural Gas Pipeline.* U.S. Department of the Interior, Bureau of Land Management, Rawlins, WY; Craig, CO; and Vernal, UT District Offices.

_____ (USDI-BLM). 1992b. *Union Pacific Resources Company Greater Wamsutter Area Natural Gas Project Environmental Assessment.* U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area, Rawlins, WY.

----- (USDI-BLM). 1994. Unpublished Water Quality Data provided by Jerry Jech, Watershed Specialist, U.S. Department of the Interior, Bureau of Land Management, Rawlins District, Rawlins, WY.

----- (USDI-BLM). 1995. *Draft Environmental Impact Statement, Union Pacific Resources Company, Greater Wamsutter Area II Natural Gas Development Project.* U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area, Rawlins, WY. BLM/WY/ES-95/003+1310.

U.S. Geological Survey (USGS). Undated. Hydrologic Unit and Watershed Map Unit Overlay.

Unknown. 1993. Candidate Species of Wyoming. August 1993. 14 pp.

Vallentine, J.F. 1971. *Range Development and Improvements.* 2nd Ed. Brigham Young University Press, Provo, UT. 545 pp.

Welsh, S.W., N.D. Atwood, L.C. Higgins, and S. Goodrich. 1987. *A Utah Flora.* Great Basin Natl. Mem. No. 9. Brigham Young University Press, Provo, UT. 894 pp.

Weynand, B. and B. Amidon. 1990. An Illustrated Field Guide to the Sensitive Plants of the Rock Springs District. U.S. Department of the Interior, Bureau of Land Management, Rock Springs District. BLM-WY-AE-91-007-4332. 31 pp.

Whitson, T.D. et al. 1987. *Weeds and Poisonous Plants of Wyoming and Utah.* Univ. Wyoming Coop. Ext. Serv. B-855-UW. Utah State Univ. Coop. Ext. Serv. and Agric. Expt. Sta. Res. Rep. 116-USU. 282 pp.

Whitson, T.D., L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee, and R. Parker. 1991. *Weeds of the West.* The Western Society of Weed Science. Published in cooperation with the Western United States Land Grant Universities Coop. Ext. Serv. 630 pp.

Windell, J.T., B.E. Willard, D.J. Cooper, S.Q. Foster, C.F. Knud-Hansen, L.P. Rink, and G.N. Kidalis. 1986. *An Ecological Characterization of Rocky Mountain Montane and Subalpine Wetlands.* U.S. Department of the Interior, Fish and Wildlife Service Biol. Rep. 86(11). Washington, D.C. 298 pp.

APPENDICES

Appendix A - Data Forms

Appendix B - Species Lists

Appendix C - Personal and Written Communications

APPENDIX A:

DATA FORMS

APPENDIX A-1

Detailed Vegetation/Soils Sample Point Data Forms

Sample Point # D-1

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids Assoc.
Location: QQ Sec. SW1/4 NE1/4 Sec. 16 T: 21N R: 93W
Soil Series/phase: Subgroup[1]:
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-10	2.5Y5/4	silt loam	damp
10-18+	"	silty clay loam	"

n/a Histosol n/a Histic epipedon

n/a Gley: Color:

Depth:

n/a Mottles: Matrix Color:

Mottle Color:

Depth:

Mottle Contrast:

Mottle Size:

Mottle Abundance:

Mottle Intensity:

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Haplopappus acaulis	UPL	35
2. Arenaria hookeri	UPL	30
3. Phlox hoodii	UPL	10
4. Phlox bryoides	UPL	10
5. Stipa pinetorum	UPL	10
6. Agropyron smithii	FACU	5
7.		
8.		
9.		
10.		
11.		
12.		

Vegetation Cover Type:
Cushion plant area

OTHER SOIL FEATURES/NOTES

- Actual vegetal cover = 20%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-2

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. SE1/4 SE1/4 Sec. 22 T: 21N R: 93W
Soil Series/phase: — Subgroup[1]: —
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-8	10YR4/4	silty clay loam	dry to damp
8-18+	10YR4/3	silt loam	damp

N/A Histosol n/a Histic epipedon

n/a Gley: Color:
Depth:

n/a Mottles: Matrix Color:
Mottle Color:
Depth:
Mottle Contrast:
Mottle Size:
Mottle Abundance:
Mottle Intensity:

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia pedatifida	UPL	80
2. Opuntia polyacantha	UPL	10
3. Ceratoides lanata	UPL	10
4.		
5. Agropyron smithii	FACU	50
6. Poa secunda	UPL	25
7. Phlox hoodii	UPL	10
8. Festuca idahoensis	FACU*	10
9. Foliose lichen	UPL	5
10. Antennaria sp.	UPL	Trace
11.		
12.		

Vegetation Cover Type:
Sagebrush-Grassland / Cushion plant

OTHER SOIL FEATURES/NOTES

- Soil profile excavated on a windswept flat with scattered surface pediments
- Actual vegetal cover = 30%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-3

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. NW¼SW¼ Sec. 23 T: 21N R: 93W
Soil Series/phase: — Subgroup[1]: —
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-18+	10YR4/3	fine sandy silt loam	damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color:

Depth:

n/a Mottles: Matrix Color:

Mottle Color:

Depth:

Mottle Contrast:

Mottle Size:

Mottle Abundance:

Mottle Intensity:

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	100
2.		
3. Agropyron spicatum	UPL	25
4. Stipa pinetorum	UPL	20
5. Lepidium spp.	*UPL	15
6. Agropyron Smithii	FACU	10
7. Bromus tectorum	UPL	10
8. Arabis perdulocarpa	UPL	5
9. Sitanion hystrix	UPL	5
10. Oryzopsis hymenoides	UPL	5
11. Poa Secunda	UPL	5
12.		

Vegetation Cover Type:
Sagebrush-grassland

OTHER SOIL FEATURES/NOTES

• Sagebrush covers 50%; understory species cover 75% of ground

1 - Classification according to "Soil Taxonomy."

Sample Point # D-4

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. SW1/4 NW1/4 Sec. 6 T: 19N R: 93W
Soil Series/phase: _____ Subgroup[1]: _____
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-18+	10YR4/4	silt loam	dry to damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color: _____ Depth: _____

n/a Mottles: Matrix Color: _____ Mottle Color: _____ Depth: _____ Mottle Contrast: _____ Mottle Size: _____ Mottle Abundance: _____ Mottle Intensity: _____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia arbuscula	UPL	40
2. Artemisia pedatifida	UPL	40
3. Atriplex gardneri	UPL	20
4.		
5. Agropyron smithii	FACU	50
6. Sitanion hystrix	UPL	20
7. Phlox hoodii	UPL	10
8. Festuca idahoensis	FACU*	10
9. Astragalus spp.	*UPL	10
10.		
11.		
12.		

Vegetation Cover Type: Sagebrush-Grassland

OTHER SOIL FEATURES/NOTES

Total shrub cover = 30%, forb cover = 60%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-5

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. C-SE1/4 Sec. 8 T: 18N R: 93W
Soil Series/phase: — Subgroup[1]: —
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-6	10YR4/4	fine sandy silt loam	dry
6-18+	"	"	damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color:

Depth:

n/a Mottles: Matrix Color:

Mottle Color:

Depth:

Mottle Contrast:

Mottle Size:

Mottle Abundance:

Mottle Intensity:

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	60
2. Chrysothamnus nauseosus	UPL	30
3. Ceratoides lanata	UPL	10
4.		
5. Agropyron smithii	FACU	60
6. Poa secunda	UPL	20
7. Oryzopsis hymenoides	UPL	10
8. Phlox hoodii	UPL	5
9. Stanion hystrix	UPL	5
10.		
11.		
12.		

Vegetation Cover Type:
Sagebrush-grassland

OTHER SOIL FEATURES/NOTES

- Shrub cover = 60%
- Soil has 15% gravels

1 - Classification according to "Soil Taxonomy."

Sample Point # D-6

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. NE1/4 NE1/4 Sec. 17 T: 18N R: 93W
Soil Series/phase: ____ Subgroup[1]: ____
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-6	10YR4/4	sandy silt loam	dry
6-18+	—	fractured sandstone	"

n/a Histosol n/a Histic epipedon

n/a Gley: Color: ____
Depth: ____

n/a Mottles: Matrix Color: ____
Mottle Color: ____
Depth: ____
Mottle Contrast: ____
Mottle Size: ____
Mottle Abundance: ____
Mottle Intensity: ____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	30
2. Chrysothamnus nauseosus	UPL	20
3. Artemisia spinescens	UPL	20
4. Artemisia tridentata	UPL	15
5. Chrysothamnus viscidiflorus	UPL	10
6. Ceratoides lanata	UPL	5
7.		
8. Oryzopsis hymenoides	UPL	35
9. Poa secunda	UPL	20
10. Sitanion hystrix	UPL	20
11. Agropyron smithii	FACU	20
12. Phlox hoodii	UPL	5

Vegetation Cover Type:
Salt desert scrub

OTHER SOIL FEATURES/NOTES

• shrub cover = 30% ; herbaceous cover = 20%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-7

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. NW/4 NW/4 Sec. 6 T: 21N R: 93W
Soil Series/phase: — Subgroup[1]: —
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-12	10YR3/3	silty clay loam	damp
12-18+	"	"	moist

n/a Histosol n/a Histic epipedon

n/a Gley: Color:

Depth:

n/a Mottles: Matrix Color:

Mottle Color:

Depth:

Mottle Contrast:

Mottle Size:

Mottle Abundance:

Mottle Intensity:

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	40
2. Sarcobatus vermiculatus	FACU+	35
3. Atriplex gardneri	UPL	15
4. Artemisia spinescens	UPL	10
5.		
6. Sitanion hystrix	UPL	60
7. Oryzopsis hymenoides	UPL	20
8. Poa secunda	UPL	20
9. Lepidium sp.	*UPL	Trace
10.		
11.		
12.		

Vegetation Cover Type:
salt desert scrub

OTHER SOIL FEATURES/NOTES

• Shrub cover = 60%; herbaceous cover = 5%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-8

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. NE1/4 SW1/4 Sec. 2 T: 19N R: 94W
Soil Series/phase: _____ Subgroup[1]: _____
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-18+	10YR3/4	sil loam	damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color: _____ Depth: _____

n/a Mottles: Matrix Color: _____ Mottle Color: _____ Depth: _____ Mottle Contrast: _____ Mottle Size: _____ Mottle Abundance: _____ Mottle Intensity: _____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	70
2. Artemisia tridentata wyomingensis	UPL	30
3.		
4. Oryzopsis hymenoides	UPL	40
5. Agropyron smithii	FACU	30
6. Poa secunda	UPL	15
7. Festuca idahoensis	FACU*	10
8. Sitanion hystrix	UPL	5
9.		
10.		
11.		
12.		

Vegetation Cover Type: salt desert scrub

OTHER SOIL FEATURES/NOTES

• shrub cover = 50%; herbaceous cover = 25%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-9

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. SE¼ SW¼ Sec. 2 T: 19N R: 94W
Soil Series/phase: — Subgroup[1]: —
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-18+	10YR4/3	silt loam	damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color: ____ Depth: ____

n/a Mottles: Matrix Color: ____ Mottle Color: ____ Depth: ____ Mottle Contrast: ____ Mottle Size: ____ Mottle Abundance: ____ Mottle Intensity: ____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	100
2.		
3. Agropyron smithii	FACU	60
4. Bromus tectorum	UPL	20
5. Festuca idahoensis	FACU*	10
6. Poa secunda	UPL	10
7.		
8.		
9.		
10.		
11.		
12.		

Vegetation Cover Type: Sagebrush-grassland

OTHER SOIL FEATURES/NOTES

Shrub cover = 50%; herbaceous cover = 50%

1 - Classification according to "Soil Taxonomy."

Sample Point # D-10

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. SW1/4SE1/4 Sec. 24 T: 19N R: 94W
Soil Series/phase: _____ Subgroup[1]: _____
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-10	10YR4/4	silty clay	damp
10-18+	"	"	moist

n/a Histosol n/a Histic epipedon

n/a Gley: Color: _____ Depth: _____

n/a Mottles: Matrix Color: _____ Mottle Color: _____ Depth: _____ Mottle Contrast: _____ Mottle Size: _____ Mottle Abundance: _____ Mottle Intensity: _____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	100
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		

Vegetation Cover Type: salt desert scrub

OTHER SOIL FEATURES/NOTES

shrub cover = 70%; no herbaceous cover

1 - Classification according to "Soil Taxonomy."

Sample Point # D-11

ECOTONE SOIL SAMPLE DATA FORM

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: July 13 & 14, 1994
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Lincoln, Sweetwater
Applicant/Owner: Amoco & other Operators Soil Type: Torriorthents - Camborthids - Haplargids
Location: QQ Sec. NW1/4 NE1/4 Sec. 24 T: 17N R: 94W
Soil Series/phase: _____ Subgroup[1]: _____
Have the vegetation or soils been significantly disturbed? No

SOIL FEATURES

Depth (in.)	Color (Moist)	Texture	Moisture
0-18+	7.5YR4/4	silt loam	damp

n/a Histosol n/a Histic epipedon

n/a Gley: Color: _____ Depth: _____

n/a Mottles: Matrix Color: _____ Mottle Color: _____ Depth: _____ Mottle Contrast: _____ Mottle Size: _____ Mottle Abundance: _____ Mottle Intensity: _____

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia pedatifida	UPL	40
2. Atriplex gardneri	UPL	40
3. Astragalus sp.	*UPL	20
4.		
5. Sitanion hystrix	UPL	40
6. Oryzopsis hymenoides	UPL	30
7. Festuca idahoensis	FACU*	10
8. Poa secunda	UPL	10
9. Agropyron smithii	FACU	10
10.		
11.		
12.		

Vegetation Cover Type: Salt desert scrub

OTHER SOIL FEATURES/NOTES

- shrub cover = 40%, herbaceous cover = 30%

1 - Classification according to "Soil Taxonomy."

APPENDIX A-2

Wetland Sample Point Data Forms

Sample Point # W-1

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Saline Subirrigated Meadow
Location: Sec. 27 T: 21N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Carex nebrascensis	OBL	95
2. Poa pratensis	FAC	5
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	10YR3/2	Coarse sandy clay	Sat.
mottles: large, strong, indistinct @ 2+"			

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: _____ Subgroup[1]: _____
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 10YR3/2 Mottle Color 10YR5/6 Depth 2"
Other hydric soil indicators: Shallow water table
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit 10 (in)
Depth to Saturated Soil 0 (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
X Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-2
• on stock pond meadow fringe

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: subirrigated meadow
Location: Sec. 27 T: 21N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Eleocharis palustris	OBL	40
2. Juncus balticus	FACW+	20
3. Carex nebrascensis	OBL	20
4. Poa pratensis	FAC	15
5. Ranunculus cymbalaria	OBL	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	2.5Y3/0	heavy clay	Sat.

mottles: numerous, small, strong, indistinct @ 2+11

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants; veg. heavily grazed

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y 3/0 Mottle Color 10YR5/6 Depth 2+
Other hydric soil indicators: Shallow Water Table
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit 14 (in)
Depth to Saturated Soil 0 (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
X Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-3

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subIr. mdw
Location: Sec. 27 T: 21N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia cana	FACU*	100
2. Poa pratensis	FAC	50
3. Carex nebrascensis	OBL	30
4. Agropyron Smithii	FACU	20
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-16	2.5Y3/2	silty clay	damp
16-18	"	"	moist

mottles: numerous, strong, indistinct @ 2+"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 80%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: 7 50 percent hydrophytic dominants in herbaceous layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y3/2 Mottle Color 10YR5/6 Depth 2"
Other hydric soil indicators: low Chroma
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
X Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present - mottles not convincing given lack of hydrology & lack of hydrophytic vegetation dominance

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-4

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 27 T:21N R:92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	70
2. Chrysothamnus viscidiflorus	UPL	30
3.		
4. Festuca idahoensis	FACU	30
5. Poa secunda	UPL	30
6. Agropyron spicatum	UPL	30
7. Phlox hoodii	UPL	10
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR3/4	silt loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-5
* Veg. was grazed

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: ____
Location: Sec. 35 T: 21N R:92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	100
2.		
3. Agropyron smithii	FACU	90
4. Poa secunda	UPL	5
5. Taraxacum officinale	FACU	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	2.5Y4/4	silty clay	damp

mottles: marginal, small, weak, indistinct

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color ___ Depth ___
X Mottles: Matrix Color 2.5Y4/4 Mottle Color 10YR5/6 Depth 0+
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present mottles not convincing

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil ___ (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; possible waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-6

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 3 T: 19N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACU	80
2. Bromus tectorum	UPL	15
3. Astragalus agrestis	FACW-	5
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	2.5Y4/4	silty clay loam to silty clay	damp

mottles: few, weak, indistinct, old mottles @ 4+"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 5%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y4/4 Mottle Color 10YR5/6 Depth 4+
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present mottles not convincing of hydrology

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-7

ECOTONE WETLANDS DATA FORM (east end of Coal Gulch)
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 20 T: 18N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Poa pratensis	FAC	45
2. Agropyron smithii	FACU	35
3. Achillea millefolium	FACU	10
4. Juncus balticus	FACW+	5
5. Hordeum jubatum	FAC	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-10	2.5Y 5/2	fine sandy clay	damp
10-18+	"	"	moist

mottles: few, indistinct, weak @ 10+"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 55%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y 5/2 Mottle Color 10YR 5/6 Depth 10+
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present — mottles not convincing

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-8

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 20 T: 18N R: 92W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	70
2. Artemisia spinescens	UPL	20
3. Artemisia tridentata	UPL	10
4.		
5. Sitanion hystrix	UPL	25
6. Agropyron smithii	FACU	25
7. Opuntia polyacantha	UPL	20
8. Poa secunda	UPL	20
9. Festuca idahoensis	UPL	10
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR4/4	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-9
(vegetated incised drainage)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 2 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Elymus cinereus	FAC	50
2. Agropyron smithii	FACU	20
3. Poa pratensis	FAC	15
4. Poa secunda	UPL	10
5. Cirsium sp.	UPL	5
6.		
7. Artemisia tridentata	UPL	50
8. Chrysothamnus viscidiflorus	UPL	30
9. Artemisia cana	FACU*	20
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR3/4	fine sandy clay	dry to damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 65%, 0%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants in understory layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-10

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 2 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia nova	UPL	40
2. Atriplex gardneri	UPL	30
3. Artemisia spinescens	UPL	20
4. Sarcobatus vermiculatus	FACU+	10
5.		
6. Sitanion hystrix	UPL	40
7. Oryzopsis hymenoides	UPL	40
8. Poa secunda	UPL	15
9. Eriogonum sp.	UPL	5
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR 4/4	silt loam	dry to damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-11 (Echo Springs)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: MARSH
Location: Sec. 21 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Eleocharis palustris	OBL	40
2. Scirpus acutus	OBL	30
3. Juncus balticus	FACW+	20
4. Plantago lanceolata	FAC	10
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	jet black	clay	saturated

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: inundation, low chroma
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water 1 (in)
Depth to Free Water in Pit 0 (in)
Depth to Saturated Soil 0 (in)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
X Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
X Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-12

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated meadow
Location: Sec. 21 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Plantago lanceolata	FAC	55
2. Puccinellia nuttalliana	FACW+	20
3. Agropyron smithii	FACU	20
4. Muhlenbergia richardsonis	FAC+	5
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-19+	10YR 5/2	clay loam	wet

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 80%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: salt crust on soil surface, rhizospheres (slight)
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
X Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
X Rhizospheres (slight)

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-13

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 21 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Sarcobatus vermiculatus	FACU+	90
2. Atriplex gardneri	UPL	10
3.		
4. Sitanion hystrix	UPL	80
5. Poa secunda	UPL	20
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-19+	10YR3/2	silt loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: not > 50 percent hydrophytic dominants in understory layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-14

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 10 T: 17N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACU	50
2. Hordeum jubatum	FAC	20
3. Poa pratensis	FAC	10
4. Iva axillaris	FAC	10
5. Festuca idahoensis	FACU+	10
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-10	2.5Y4/4	sandy clay	damp
10-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 40%
Is the hydrophytic vegetation criterion met? Yes ___ No x
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-15

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 28 T: 22N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron Smithii	FACU	85
2. Astragalus agrestis	FACW-	15
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	2.5y 4/4	silty clay	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 15%
Is the hydrophytic vegetation criterion met? Yes ___ No x
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined x
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No x
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No x
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No x
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-16

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Wet Meadow
Location: Sec. 21 T: 22N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Hordeum jubatum	FAC	40
2. Astragalus agrestis	FACW-	20
3. Rorippa curvisiliqua	FACW+	20
4. Sitanion hystrix	UPL	15
5. Chaenactis sp. (?)	UPL	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-4	2.5y4/4	silty clay	damp
4-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 80%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: topographic depression that collects spring runoff
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-17
ephemeral drainage/vegetated swale

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 26 T: 21N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata wyomingensis	UPL	60
2. Chrysothamnus viscidiflorus	UPL	40
3.		
4. Poa secunda	UPL	45
5. Agropyron spicatum	UPL	25
6. Koeleria macrantha	UPL	10
7. Trifolium sp.	*FAC-	5
8. Lepidium sp.	UPL	5
9. Festuca idahoensis	FACU*	5
10. Agropyron dasystachyum	FACU-	5

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR4/3	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-18

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 26 T: 21N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata wyomingensis	UPL	80
2. Chrysothamnus viscidiflorus	UPL	20
3.		
4. Poa secunda	UPL	35
5. Agropyron smithii	FACU	30
6. Agropyron spicatum	UPL	15
7. Festuca idahoensis	FACU*	10
8. Oitanion hystrix	UPL	5
9. Lepidium montanum	NI(FACW?)	5
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR4/2	silt loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 5%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-9

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: ~~Carbon~~, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 6 T: 19N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	100
2.		
3. Agropyron smithii	FACU	100
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	2.5Y4/4	silty clay to clay	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants (desiccated/grazed)

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-20

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon,) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 7 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACU	60
2. Hordeum jubatum	FAC	20
3. Iva axillaris	FAC	15
4. Lepidium montanum	NI (FACW?)	5
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	10YR4/4	silty clay	damp
8-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 40%
Is the hydrophytic vegetation criterion met? Yes ____ No x
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined x
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color ____ Depth —
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No x
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ____ No x
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ____ No x
Rationale for jurisdictional decision: no parameters met; Hisa waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-21 (pt. in bottom of "lake" basin)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: ~~Carbon~~, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 20 T: 18N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron Smithii	FACU	45
2. Iva xWillaris	FAC	35
3. Hordeum jubatum	FAC	10
4. Astragalus agrestis	FACW-	10
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	10YR4/4	silty clay	damp
8-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 55%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met; it is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-22

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: ~~Carbon~~, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Marsh/Saline Subirrigated Mdw.
Location: Sec. 17 T: 18N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Puccinellia nuttalliana	FACW+	50
2. Hordeum jubatum	FAC	20
3. Muhlenbergia filiformis	FACW-	20
4. Eleocharis palustris	OBL	10
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-4	2.5Y 4/4	heavy clay	wet
4-18+	"	"	saturated

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color ___ Depth ___
___ Mottles: Matrix Color ___ Mottle Color black Depth 4+"
Other hydric soil indicators: sulfur odor, saturation
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil 4 (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
X Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
X Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
X Low Chroma
X Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-23

(Pt. in "lake" bottom)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 9 T:18N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACU	75
2. Iva Axillaris	FAC	20
3. Muhlenbergia filiformis	FACW-	5
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-10	10YR 4/4	heavy clay	dry
10-18+	"	"	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 25%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants (scattered (10%) Tush ATSA nearby)

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; it is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-24
(near hack site)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated meadow
Location: Sec. 16 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Juncus balticus	FACW+	80
2. Eleocharis palustris	OBL	20
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	2.5Y5/4	silty clay	moist
6-18+	"	"	moist-wet

mottles: few, indistinct, weak @ 10+'

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y5/4 Mottle Color 2.5Y6/8 Depth 10+
Other hydric soil indicators: internal drainage
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
X Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W1-25

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Marsh/Saline meadow
Location: Sec. 9 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Juncus balticus	FACW+	60
2. Eleocharis palustris	OBL	30
3. Muhlenbergia filiformis	FACW-	10
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	black	muck	saturated
6-18	2.5y4/4	silty clay loam	"
mottles: common, large, indistinct, weak @ 8+			

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5y 4/4 Mottle Color 2.5y 6/8 Depth 8+
Other hydric soil indicators: saturation
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil 0 (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
X Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
X Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
X Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-26

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 16 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACU	80
2. Agropyron cristatum	UPL	15
3. Muhlenbergia filiformis	FACW-	5
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	2.5y4/3	silty clay loam	dry to damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 5%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
X Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-27

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 9 T:18N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	75
2. Tetradymia spinosa	UPL	20
3. Artemisia tridentata	UPL	5
4.		
5. Sitanion hystrix	UPL	60
6. Oryzopsis humenoides	UPL	30
7. Poa secunda	UPL	10
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	2.5Y 4/3	silty clay loam	dry
8-18+	"	"	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No x
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No x
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-28

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 9 T: 18N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Tetradymia spinosa	UPL	60
2. Atriplex gardneri	UPL	40
3.		
4. Sitanion hystrix	UPL	60
5. Oryzopsis hymenoides	UPL	40
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	7.5yp4/4	fine sandy silt	dry
0-18+	"	"	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-29
(internally drained depression)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 8/9 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron smithii	FACW	80
2. Heleocharis palustris	OBL	10
3. Astragalus agrestis	FACW-	5
4. small white-flowered (?)	NI	5
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	10YR4/4	silty clay	damp
6-18+	"	"	moist

• soil surface cracked from recent inundation

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 15
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: topographic position
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; possible waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-30
(pt. in "lake" bottom)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: ~~Carbon~~ Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Dpland
Location: Sec. 9 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	100
2.		
3. Agropyron smithii	FACU	75
4. Bo gracilis	FAC	20
5. Muhlenbergia filiformis	FACW-	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-10	10YR4/4	heavy clay	dry
10-18+	"	"	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 25%
Is the hydrophytic vegetation criterion met? Yes ___ No x
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined x
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No Y
Rationale for jurisdictional decision: no parameters met; it is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-31 (below dam of Gvt Res.)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated mdw.
Location: Sec. 17 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Carex nebrascensis	OBL	70
2. Juncus balticus	FACW+	15
3. Deschampsia cespitosa	FACW	10
4. Eleocharis palustris	OBL	5
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-4	—	organic matter	moist
4-18	10YR4/3	silty clay loam	moist to wet
mottles: numerous, distinct, moderate @ 8+"			

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 10YR4/3 Mottle Color 10YR5/6 Depth 8
Other hydric soil indicators: surface layer = OM
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
X Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-32

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Alkali scrub
Location: Sec. 17 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Sarcobatus vermrulatus	FACU+	70
2. Artemisia tridentata	UPL	30
3.		
4. Agropyron smithii	FACU	80
5. Poa secunda	UPL	10
6. Hordeum jubatum	FAC	10
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	10YR4/4	silty clay loam w/ gypsum deposits	dry
6-18	"	"	damp
18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 10%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color ___ Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-33 (vegetated swale)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: (Carbon,) Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated mdw.
Location: Sec. 16/17 T: 18N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Juncus balticus	FACW+	40
2. Hordeum jubatum	FAC	25
3. Carex praegracilis	FACW	20
4. Poa Secunda	UPL	15
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	10YR4/3	coarse sandy clay	dry
8-14	"	"	damp
14-18+	"	"	moist

mottles: common, distinct, strong @ 6+"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 85%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined X
____ Histosol ____ Histic epipedon ____ Gley: Color — Depth —
X Mottles: Matrix Color 10YR4/3 Mottle Color 10YR5/6 Depth 6+
Other hydric soil indicators: topography; mottling
Is the hydric soil criterion met? Yes X No ____
Rationale: positive indicators present

HYDROLOGY

____ Recorded Data
____ Stream, Lake, or Tide Group
x Aerial Photographs
____ Other
____ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
____ Inundated
____ Saturated
____ Water Marks/Drift Lines
____ Fluvial Geomorphic Position
____ Sediment Deposits
X Drainage Patterns in Wetlands
____ Sulfur Odor

Secondary Indicators:
____ Organic staining
____ Water-stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
X Mottles
____ Gley
____ Low Chroma
____ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ____
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ____
Rationale for jurisdictional decision: all parameters met (seasonal wetland)

1 - Classification according to "Soil Taxonomy."

Sample Point # W-34

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated mdw.
Location: Sec. 32 T:22N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Astragulus agrestis	FACW-	55
2. Puccinellia nuttalliana	FACW+	35
3. Rorippa curvisiliqua curvisiliqua	FACW+	10
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	2.5Y4/4	silty clay loam	damp
6-18+	"	silty clay	"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-35

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 5 T: 21N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Agropyron Smithii	FACU	60
2. Astragalus agrestis	FACW-	20
3. Festuca idahoensis	FACU*	20
4. Chaenactis sp.	* UPL	TR
5. Hordeum jubatum	FAC	TR
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	2.5y 4/4	silt loam	damp
8-18+	"	"	"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 20%
Is the hydrophytic vegetation criterion met? Yes ___ No x
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined x
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No x
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No x
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # N-36

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 11 T: 20N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	60
2. Artemisia spinescens	UPL	40
3.		
4. Oryzopsis hymenoides	UPL	30
5. Festuca idahoensis	FACU*	30
6. Stanion hystrix	UPL	20
7. Poa secunda	UPL	20
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	10YR4/3	silt loam	damp
6-18	"	silty clay loam	"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-37

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: saline subirrigated mdw
Location: Sec. 26 T: 19N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Hordeum jubatum	FAC	70
2. Agropyron smithii	FACU	30
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18 +	2.5Y4/4	clay	damp
	mottles: numerous, strong, distinct @ 2+"		

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 70%
Is the hydrophytic vegetation criterion met? Yes x No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
X Mottles: Matrix Color 2.5Y4/4 Mottle Color 7.5YR5/6 Depth 2+"
Other hydric soil indicators:
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met (marginal site)

1 - Classification according to "Soil Taxonomy."

Sample Point # W-38

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 26 T: 19N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Sarcobatus vermiculatus	FACU+	95
2. Atriplex gardneri	UPL	5
3.		
4. Agropyron smithii	FACU	95
5. Sitanion hystrix	UPL	5
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-10	10YR4/4	silty clay	damp
10-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-39

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Saline subirrigated Meadow
Location: Sec. 31 T:22N R:93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Ivaxillaris	FAC	100
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-16	2.5Y4/4	heavy clay	damp
16-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met; is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-40

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Playa/Mudflat
Location: Sec. 31 T: 22N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Iva axillaris	FAC	100
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	2.5y 4/4	silty clay	damp
6-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met; but is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-41

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Alkali scrub
Location: Sec. 31 T: 22N R: 93W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	100
2.		
3. Iva axillaris	FAC	30
4. Agropyron smithii	FACU	25
5. Puccinellia nuttalliana	FACW+	25
6. Sitanion hystrix	UPL	15
7. Allium textile	UPL	5
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	2.5Y4/4	silty clay	damp
6-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 55%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants in herbaceous layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: not all parameters met; but is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-42

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Marsh/Saline Meadow
Location: Sec. 28 T: 18N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Eleocharis palustris	OBL	55
2. Agropyron smithii	FACU	30
3. Juncus balticus	FACW+	15
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR3/2	heavy clay	saturated

mottles: numerous, small, weak, indistinct throughout profile

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 70%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon X Gley: Color 5G 5/1 Depth 0+
X Mottles: Matrix Color 10YR3/2 Mottle Color 10Y 5/6 Depth 0+
Other hydric soil indicators: depressional area, saturation
Is the hydric soil criterion met? Yes X No ___
Rationale: positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil 0 (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
X Mottles
X Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes X No ___
Rationale: positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes X No ___
Rationale for jurisdictional decision: all parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-43

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 28 T: 18N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia pedatifida	UPL	40
2. Atriplex gardneri	UPL	30
3. Tetradymia spinosa	UPL	20
4. Chrysothamnus viscidiflorus	UPL	10
5.		
6. Agropyron smithii	FACU	40
7. Oryzopsis hymenoides	UPL	30
8. Phlox hoodii	UPL	10
9. Festuca idahoensis	FACU*	10
10. Sitanion hystrix	UPL	10

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	7.5YR4/4	silt loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-44

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: Alkali scrub
Location: Sec. 21 T: 18N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Sarcobatus vermiculatus	FACU+	80
2. Atriplex gardneri	UPL	20
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	5YR3/4	silty clay	damp
6-18+	5YR4/4	clay	"

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-45 (red lake)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Mudflat/phyla
Location: Sec. 16 T: 18N R: 94W.
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Iva axillaris	FAC	100
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	5yR3/4	clay	damp
6-18	5yR4/4	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ____ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ____ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ____ No X
Rationale for jurisdictional decision: not all parameters met; but is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-46

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: playa
Location: Sec. 10 T: 22N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	VPL	100
2. (around margins)		
3.		
4. no veg. w/i playa		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-8	2.5y4/4	silty clay	damp
8-18	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) n/a
Is the hydrophytic vegetation criterion met? Yes ___ No ___
Rationale: 50 percent hydrophytic dominants

SOILS

Series/phase: ___ Subgroup[1]: ___
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; but it is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-47

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/13/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, ~~Sweetwater~~
Applicant/Owner: UPRC and other operators Plant Community #/Name: mudflat / playa
Location: Sec. 27 T:22N R:94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Sarcobatus vermiculatus	FACU+	100
2.		
3. no understory		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18	2.5Y5/4	silty clay	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

*appears to have shallow ponded water earlier in the spring

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; possible waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-48 (Black Lake)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 15 T:21N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	40
2. Artemisia nova	UPL	30
3. Chrysothamnus nauseosus	UPL	20
4. Ceratoides lanata	UPL	10
5.		
6. Agropyron smithii	FACU	40
7. Festuca idahoensis	FACU*	20
8. Poa secunda	UPL	20
9. Oryzopsis hymenoides	UPL	10
10. Phlox hoodii	UPL	5
11. Foliose lichen	UPL	5

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR4/3	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-49

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 15 T: 21N R:94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	60
2. Chrysothamnus viscidiflorus	UPL	40
3. Agropyron smithii	FACU	30
4. Oryzopsis humenoides	UPL	15
5. Festuca idahoensis	FACU*	15
6. Phlox hoodii	UPL	10
7. Ceratoides lanata	UPL	10
8. Haplopappus acaulis	UPL	10
9. Foliose lichen	UPL	5
10. Eriogonum sp.	UPL	5

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	10YR4/3	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: NO positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: NO positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: NO parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-50

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: UPLAND
Location: Sec. 17 T: 20N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Atriplex gardneri	UPL	100
2.		
3. Sitanion hystrix	UPL	100
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18"	10YR4/3	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 0%
Is the hydrophytic vegetation criterion met? Yes ___ No X
Rationale: < 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators: none
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-51 (North Barrel Springs Draw)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: 1) pland
Location: Sec. 1 T: 17N R: 95W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	50
2. Carrobatus vermiculatus	FACU+	50
3.		
4. Elymus cinereus	FAC	90
5. Agropyron smithii	FACU	10
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	2.5Y5/2	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 90%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: >50 percent hydrophytic dominants in herbaceous layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point #W-52

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Mudflat/Playa
Location: Sec. 24 T: 20N R: 95W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Iva axillaris	FAC	100
2.		
3. (desiccated)		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-4	2.5Y4/4	clay	damp
4-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 100%
Is the hydrophytic vegetation criterion met? Yes X No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: no positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
_x_ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: no positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: no parameters met; but is a waters of the U.S.

1 - Classification according to "Soil Taxonomy."

Sample Point # W-53

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 8 T: 18N R: 95W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	50
2. Sarcobatus vermiculatus	FACU+	50
3.		
4. Elymus cinereus	FAC	65
5. Agropyron smithii	FACU	35
6.		
7.		
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-18+	2.5Y 5/2	silty clay loam	damp

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 65%
Is the hydrophytic vegetation criterion met? Yes x No ___
Rationale: > 50 percent hydrophytic dominants in herbaceous layer

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: NO positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: NO positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: ND parameters met

1 - Classification according to "Soil Taxonomy."

Sample Point # W-54 (Threemile Draw-veg, swale)

ECOTONE WETLANDS DATA FORM
(Modified from the 1987 COE Wetlands Delineation Manual)

Field Investigator: O. Grah and J. Crane (ECOTONE) Date: 6/14/94
Project/Site: GWA II EIS Analysis Area State: Wyoming County: Carbon, Sweetwater
Applicant/Owner: UPRC and other operators Plant Community #/Name: Upland
Location: Sec. 14 T: 20N R: 94W
Do normal environmental conditions exist at the plant community? Yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? No

VEGETATION

Dominant Plant Species	Indicator Status	% Relative Cover
1. Artemisia tridentata	UPL	50
2. Sarcobatus vermiculatus	FACU+	30
3. Chrysothamnus viscidiflorus	UPL	20
4.		
5. Elymus cinereus	FAC	60
6. Agropyron smithii	FACU	30
7. Hordeum jubatum	FAC	10
8.		
9.		
10.		

SOILS

Depth (in.)	Color	Texture	Moisture
0-6	2.5Y 4/4	silty clay	damp
6-18+	"	"	moist

Percent of dominant species that are OBL, FACW, and/or FAC (excluding FAC-) 0%, 70%
Is the hydrophytic vegetation criterion met? Yes x No ___
Rationale: > 50 percent hydrophytic dominants

SOILS

Series/phase: — Subgroup[1]: —
Is the soil on the hydric soils list? Yes ___ No ___ Undetermined X
___ Histosol ___ Histic epipedon ___ Gley: Color — Depth —
___ Mottles: Matrix Color — Mottle Color — Depth —
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No X
Rationale: ND positive indicators present

HYDROLOGY

___ Recorded Data
___ Stream, Lake, or Tide Group
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water — (in)
Depth to Free Water in Pit — (in)
Depth to Saturated Soil — (in)

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated
___ Water Marks/Drift Lines
___ Fluvial Geomorphic Position
___ Sediment Deposits
___ Drainage Patterns in Wetlands
___ Sulfur Odor

Secondary Indicators:
___ Organic staining
___ Water-stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Mottles
___ Gley
___ Low Chroma
___ Rhizospheres

Is the wetland hydrology criterion met? Yes ___ No X
Rationale: ND positive indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the sample point located in a jurisdictional wetland? Yes ___ No X
Rationale for jurisdictional decision: ND parameters met

1 - Classification according to "Soil Taxonomy."

APPENDIX B:

SPECIES LISTS

APPENDIX B-1

General Species List by Cover Type

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Trees/Shrubs											
Allenrolfea occidentalis	Iodinebush	x							x		
Artemisia arbuscula	Low sagebrush	x	x								
Artemisia cana	Silver sagebrush					x					
Artemisia frigida	Fringed sagebrush	x	x								
Artemisia nova	Black sagebrush	x									
Artemisia pedatifida	Birdfoot sagebrush	x	x								
Artemisia spinescens	Budsage	x									
Artemisia tridentata tridentata	Basin big sagebrush	x									
Artemisia tridentata vaseyana	Mountain big sagebrush	x									
Artemisia tridentata wyomingensis	Wyoming big sagebrush	x				x			x		
Atriplex argentea	Silverscale saltbush	x									
Atriplex canescens	Four-wing saltbush	x									
Atriplex confertifolia	Shadscale	x	x								
Atriplex gardneri	Gardner saltbush	x	x						x		
Ceratoides lanata	Winterfat	x	x								
Cercocarpus montanus	True mountain mahogany	x									
Chrysothamnus greenei	Greene rabbitbrush	x									
Chrysothamnus nauseosus	Rubber rabbitbrush	x				x		x			
Chrysothamnus viscidiflorus	Low rabbitbrush	x	x			x		x			
Ephedra viridis	Green ephedra	x									
Eriogonum microthecum	Slenderbush eriogonum	x									
Grayia spinosa	Spiny hopsage	x									
Gutierrezia sarothrae	Broom snakeweed	x						x			
Kochia americana	Greenmolly	x	x								

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Leptodactylon pungens	Prickly phlox	x									
Purshia tridentata	Antelope bitterbrush	x									
Rhus trilobata	Skunkbush sumac	x									
Rosa spp.	Wild rose	x									
Salicornia spp.	Pickleweed							x	x		
Salix exigua	Sandbar willow					x					
Sarcobatus vermiculatus	Black greasewood	x	x			x		x	x		
Tamarix ramosissima	Saltcedar					x					
Tetradymia canescens	Gray horsebrush	x									
Tetradymia glabrata	Littleleaf horsebrush	x									
Tetradymia spinosa	Thorny horsebrush	x									
Xylorhiza glabriuscula	Smooth woodyaster	x									
Zuckia brandegei	Western hop-sage	x									
Succulents											
Opuntia polyacantha	Plains pricklypear	x			x						
Forbs											
Achillea millefolium	Western yarrow	x				x		x			
Allium textile	Textile onion	x	x						x		
Alyssum desertorum	Desert alyssum	x	x								
Antennaria spp.	Pussytoes	x									
Arabis pendulocarpa	Rockcress	x	x								
Arctium minus	Common burdock					x		x			
Arenaria congesta congesta	Ballhead sandwort	x									
Arenaria fendleri	Fendler sandwort	x									
Arenaria hookeri hookeri	Hooker sandwort	x	x								
Artemisia ludoviciana	Cudweed sagewort	x		x	x			x			

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Aster glaucodes	Blueleaf aster	x									
Astragalus agrestis	Field milkvetch	x						x	x		
Astragalus bisulcatus	Two-grooved locoweed	x	x								
Astragalus convallarius	Timber poisonvetch	x									
Astragalus pectinatus	Narrowleaf poisonvetch	x									
Astragalus sericoleucus aretoides	Cushion milkvetch	x	?								
Astragalus spatulatus	Spoonleaf milkvetch		x								
Atriplex suckleyi	Suckley saltbush		x						x		
Calochortus nuttallii	Sego lily	x									
Cardaria pubescens	Pubescent whitetop	x		x	x						
Castilleja chromosa	Common paintbrush	x									
Chaenactis douglasii	Douglas dusty-maiden	x									
Chenopodium spp.	Goosefoot	x		x	x	x		x			
Cirsium pulcherrimum	Thistle	x									
Cirsium spp.	Thistle			x	x	x		x			
Commandra umbellata pallida	Bastard toadflax		x								
Cryptantha flava	Yellow cryptantha	x	x								
Cryptantha flavoculata	Roughseed cryptantha	x									
Cymopterus spp.	Spring parsley	x									
Delphinium exaltatum	Tall larkspur	x									
Delphinium geyeri	Geyer larkspur	x									
Delphinium spp.	Larkspur	x									
Equisetum arvense	Field horsetail					x		x			
Equisetum hyemale	Western scouringrush					x		x			
Erigeron ochroleucus	Fleabane	x	x								
Erigeron pulcherrimus	Basin fleabane	x									

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
Scientific Name	Common Name	Upland				Wetland					
		Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Erigeron pumilus	Low fleabane	x									
Eriogonum brevicaule	Shortstem wild buckwheat	x	x								
Eriogonum capitatum	Ballhead buckwheat	x									
Eriogonum ovalifolium	Cushion buckwheat	x									
Erysimum asperum	Plains erysimum	x									
Gilia aggregata	Scarlet gilia	x									
Glycyrrhiza lepidota	American licorice				x	x		x			
Grindelia squarrosa	Curlycup gumweed	x			x	x		x			
Halogeton glomeratus	Halogeton	x		x	x			x			
Haplopappus acaulis	Stemless goldenweed	x	x								
Haplopappus ameroides	Thrifty goldenweed	x									
Haplopappus nuttallii	Nuttall's goldenweed		x								
Hymenoxys richardsonii richardsonii	Pingue hymenoxys		x								
Iva axillaris	Small-flower sumpweed				x	x		x	x		
Kochia scoparia	Mexican summercypress	x			x						
Lappula occidentalis	Western stickseed	x			x						
Lepidium montanum	Mountain pepperweed	x									
Lepidium perfoliatum	Clasping pepperweed	x			x						
Linaria spp.	Toadflax	x									
Lomatium spp.	Spring parsley	x									
Lupinus argenteus	Silvery lupine	x									
Lupinus sericeus	Silky lupine	x									
Macheranthera grindelioides	Gumweed aster	x									
Malacothrix torreyi	Torrey's desert dandelion	x									
Oenothera pallida	Pale evening primrose	x									

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Orobanche ludoviciana ludoviciana	Louisiana broomrape	x									
Oxytropis sericea	Silky crazyweed	x									
Penstemon arenicola	Sand penstemon	x									
Penstemon fremontii	Fremont penstemon	x				x					
Penstemon pachyphyllus	Thickleaf penstemon	x	?								
Penstemon strictus	Rocky Mtn. penstemon	x									
Phacelia ivesiana	Ives phacelia	x									
Phlox bryoides	Moss phlox		x								
Phlox hoodii	Hoods phlox	x	x								
Phlox longifolia	Long-leaf phlox	x									
Phlox multiflora	Flowery phlox	x									
Physaria acutiloba	Common twinpod	x	x								
Plantago lanceolata	English plantain			x	x			x			
Ranunculus cymbalaria	Seaside buttercup							x	x		
Ranunculus testiculatus	Bur buttercup	x		x	x						
Rorippa curvisiliqua curvisiliqua	Curvepod yellowcress							x	x		
Salsola iberica	Russian thistle	x		x	x						
Schoencrambe linifolia	Schoencrambe	x									
Senecio spp.	Groundsel	x									
Sphaeralcea coccinea	Scarlet globemallow	x				x		x			
Stanleya pinnata	Prince's plume	x									
Streptanthus cordatus	Heartleaf twistflower	x									
Suaeda spp.	Seepweed							x	x		
Taraxacum officinale	Common dandelion							x			
Thermopsis rhombifolia rhombifolia	Mountain thermopsis	x	x								

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Trifolium spp.	Clover	x		x					x		
Triglochin maritima	Arrowgrass	x						x	x		
Typha latifolia	Common cattail						x				
Verbascum thapsus	Flannel mullein	x		x	x	x					
Zigadenus spp.	Deathcamas	x									
Graminoids											
Agropyron cristatum desertorum	Crested wheatgrass	x			x						
Agropyron dasystachyum	Thickspike wheatgrass	x	x			x		x			
Agropyron spicatum	Bluebunch wheatgrass	x									
Agropyron smithii	Western wheatgrass	x						x	x		
Agropyron trachycaulum	Slender wheatgrass	x			x						
Agrostis stolonifera	Redtop							x			
Aristida purpurea	Purple three-awn	x									
Bromus japonicus	Japanese brome	x		x	x	x		x			
Bromus tectorum	Cheatgrass	x		x	x	x		x			
Carex filifolia	Threadleaf sedge	x									
Carex interior	Inland sedge							x			
Carex nebrascensis	Nebraska sedge						x	x			
Carex praegracilis	Clustered field sedge							x			
Deschampsia cespitosa	Tufted hairgrass							x			
Distichlis spicata	Saltgrass							x	x		
Eleocharis palustris	Creeping spikerush						x		x		
Elymus canadensis	Canada wildrye	x				x					
Elymus cinereus	Basin wildrye	x				x		x			
Elymus junceus	Russian wildrye	x				x					
Elymus salina	Salina wildrye	x						x			

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
		Upland				Wetland					
Scientific Name	Common Name	Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Festuca idahoensis	Idaho fescue	x				x					
Festuca octoflora	Six-week's fescue	x			x						
Hilaria jamesii	Galleta	x									
Hordeum jubatum	Foxtail barley					x		x			
Hordeum vulgare	Common barley	x									
Juncus balticus	Baltic rush					x		x	x		
Koeleria macrantha	Junegrass	x									
Leucopoa kingii	Spike fescue	x									
Muhlenbergia asperifolia	Alkali muhly							x	x		
Muhlenbergia filiformis	Pullup muhly							x	x		
Muhlenbergia richardsonis	Mat muhly	x						x			
Oryzopsis contracta	Contracted ricegrass	x			x						
Oryzopsis hymenoides	Indian ricegrass	x	x		x						
Phragmites australis	Common reed					x	x				
Poa canbyi	Canby bluegrass	x									
Poa fendleriana	Mutton bluegrass	x				x		x			
Poa juncifolia	Alkali bluegrass	x						x			
Poa pratensis	Kentucky bluegrass			x		x		x			
Poa secunda secunda	Sandberg bluegrass	x							x		
Puccinellia nuttalliana	Nuttall's alkaligrass							x	x		
Scirpus acutus	Hardstem bulrush						x				
Scirpus spp.	Bulrush						x				
Sitanion hystrix	Bottlebrush squirreltail	x	x						x		
Spartina gracilis								x			
Sporobolus airoides	Alkali sacaton	x						x			
Sporobolus cryptandrus	Sand dropseed	x									

Appendix B-1. Vegetation Cover Type Species List for the GWA II Analysis Area, Continued.

SPECIES		COVER TYPES									
Scientific Name	Common Name	Upland				Wetland					
		Mixed Desert Shrub	Barren Land/Cushion Plant	Urban Land	Disturbed Land	Riparian Shrub	Marsh	Wet Meadow	Mudflat/Playa	Aquatic Bed/Open Water	Riverine
Stipa comata	Needle-and-thread	x									
Stipa lettermani	Letterman needlegrass	x									
Stipa pinetorum	Pinewoods needlegrass	x	x								

1 - MDS = mixed desert shrub
2 - This plant is a succulent rather than a shrub.

APPENDIX B-2

Species List and Wetlands Indicator Status

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Allenrolfea occidentalis	Iodinebush	FACW+
Artemisia arbuscula	Low sagebrush	UPL
Artemisia cana	Silver sagebrush	FACU*
Artemisia frigida	Fringed sagebrush	UPL
Artemisia nova	Black sagebrush	UPL
Artemisia pedatifida	Birdfoot sagebrush	UPL
Artemisia spinescens	Budsage	UPL
Artemisia tridentata tridentata	Basin big sagebrush	UPL
Artemisia tridentata vaseyana	Mountain big sagebrush	UPL
Artemisia tridentata wyomingensis	Wyoming big sagebrush	UPL
Atriplex argentea	Silverscale saltbush	FAC-
Atriplex canescens	Four-wing saltbush	UPL
Atriplex confertifolia	Shadscale	UPL
Atriplex gardneri	Gardner saltbush	UPL
Ceratoides lanata	Winterfat	UPL
Cercocarpus montanus	True mountain mahogany	UPL
Chrysothamnus greenei	Greene rabbitbrush	UPL
Chrysothamnus nauseosus	Rubber rabbitbrush	UPL
Chrysothamnus viscidiflorus	Low rabbitbrush	UPL
Ephedra viridis	Green ephedra	UPL
Eriogonum microthecum	Slenderbush eriogonum	UPL
Grayia spinosa	Spiny hopsage	UPL
Gutierrezia sarothrae	Broom snakeweed	UPL
Kochia americana	Greenmolly	FACU
Leptodactylon pungens	Prickly phlox	UPL
Purshia tridentata	Antelope bitterbrush	UPL
Rhus trilobata	Skunkbush sumac	NI(FAC?)
Rosa spp.	Wild rose	*FACU
Salicornia spp.	Samphire, pickleweed	OBL
Salix exigua	Sandbar willow	OBL
Sarcobatus vermiculatus	Black greasewood	FACU+

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area, Continued.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Tamarix ramosissima	Saltcedar	FACW
Tetradymia canescens	Gray horsebrush	UPL
Tetradymia glabrata	Littleleaf horsebrush	UPL
Tetradymia spinosa	Thorny horsebrush	UPL
Xylorhiza glabriuscula	Smooth woodyaster	UPL
Zuckia brandegei	Western hop-sage	UPL
Succulents		
Opuntia polyacantha	Plains pricklypear	UPL
Forbs		
Achillea millefolium	Western yarrow	FACU
Allium textile	Textile onion	UPL
Alyssum desertorum	Desert alyssum	UPL
Antennaria spp.	Pussytoes	UPL
Arabis pendulocarpa	Rockcress	UPL
Arctium minus	Common burdock	*FAC-
Arenaria congesta congesta	Ballhead sandwort	UPL
Arenaria fendleri	Fendler sandwort	UPL
Arenaria hookeri hookeri	Hooker sandwort	UPL
Artemisia ludoviciana	Cudweed sagewort	FACU-*
Aster glaucodes	Blueleaf aster	UPL
Astragalus agrestis	Field milkvetch	FACW-
Astragalus bisulcatus	Two-grooved locoweed	UPL
Astragalus convallarius	Timber poisonvetch	UPL
Astragalus pectinatus	Narrowleaf poisonvetch	UPL
Astragalus sericoleucus aretoides	Cushion milkvetch	UPL
Astragalus spatulatus	Spoonleaf milkvetch	UPL
Atriplex suckleyi	Suckley saltbush	*FACU
Calochortus nuttallii	Sego lily	UPL
Cardaria pubescens	Pubescent whitetop	UPL
Castilleja chromosa	Common paintbrush	UPL
Chaenactis douglasii	Douglas dusty-maiden	UPL

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area, Continued.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Chenopodium spp.	Goosefoot	*FAC-
Cirsium pulcherrimum	Thistle	UPL
Cirsium spp.	Thistle	*FAC-
Commandra umbellata pallida	Bastard toadflax	UPL
Cryptantha flava	Yellow cryptantha	UPL
Cryptantha flavoculata	Roughseed cryptantha	UPL
Cymopterus spp.	Spring parsley	UPL
Delphinium exaltatum	Tall larkspur	UPL
Delphinium geyeri	Geyer larkspur	UPL
Delphinium spp.	Larkspur	*FACU
Equisetum arvense	Field horsetail	FAC
Equisetum hyemale	Western scouringrush	FACW
Erigeron ochroleucus	Fleabane	UPL
Erigeron pulcherrimus	Basin fleabane	UPL
Erigeron pumilus	Low fleabane	UPL
Eriogonum brevicaule	Shortstem wild buckwheat	UPL
Eriogonum capitatum	Buckwheat	UPL
Eriogonum ovalifolium	Cushion buckwheat	UPL
Erysimum asperum	Plains erysimum	UPL
Gilia aggregata	Scarlet gilia	UPL
Glycyrrhiza lepidota	American licorice	FAC+
Grindelia squarrosa	Curlycup gumweed	FACU
Halogeton glomeratus	Halogeton	UPL
Haplopappus acaulis	Stemless goldenweed	UPL
Haplopappus ameroides	Thrifty goldenweed	UPL
Haplopappus nuttallii	Nuttall's goldenweed	UPL
Hymenoxys richardsonii richardsonii	Pingue hymenoxys	UPL
Iva axillaris	Small-flower sumpweed	FAC
Kochia scoparia	Mexican summercypres	FAC
Lappula occidentalis	Western stickseed	UPL
Lepidium montanum	Mountain pepperweed	NI(FACW?)

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area, Continued.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Lepidium perfoliatum	Clasping pepperweed	FACU+
Linaria spp.	Toadflax	UPL
Lomatium spp.	Spring parsley	UPL
Lupinus argenteus	Silvery lupine	UPL
Lupinus sericeus	Silky lupine	UPL
Macheranthera grindelioides	Gumweed aster	UPL
Malacothrix torreyi	Torrey's desert dandelion	UPL
Oenothera pallida	Pale evening primrose	UPL
Orobanche ludoviciana ludoviciana	Louisiana broomrape	UPL
Oxytropis sericea	Silky crazyweed	UPL
Penstemon arenicola	Sand penstemon	UPL
Penstemon fremontii	Fremont penstemon	UPL
Penstemon pachyphyllus	Thickleaf penstemon	UPL
Penstemon strictus	Rocky Mtn. penstemon	UPL
Phacelia ivesiana	Ives phacelia	UPL
Phlox bryoides	Moss phlox	UPL
Phlox hoodii	Hoods phlox	UPL
Phlox longifolia	Long-leaf phlox	UPL
Phlox multiflora	Flowery phlox	UPL
Physaria acutiloba	Common twinpod	UPL
Plantago lanceolata	English plantain	FAC
Ranunculus cymbalaria	Seaside buttercup	OBL
Ranunculus testiculatus	Bur buttercup	UPL
Rorippa curvisiliqua curvisiliqua	Curvepod yellowcress	FACW+
Salsola iberica	Russian thistle	UPL
Schoencrambe linifolia	Schoencrambe	UPL
Senecio spp.	Groundsel	*FACU
Sphaeralcea coccinea	Scarlet globemallow	UPL
Stanleya pinnata	Prince's plume	UPL
Streptanthus cordatus	Heartleaf twistflower	UPL
Suaeda spp.	Seepweed	*FACW

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area, Continued.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Taraxacum officinale	Common dandelion	FACU
Thermopsis rhombifolia rhombifolia	Mountain thermopsis	FACU
Trifolium spp.	Clover	*FAC-
Triglochin maritima	Arrowgrass	OBL
Typha latifolia	Common cattail	OBL
Verbascum thapsus	Flannel mullein	UPL
Zigadenus spp.	Deathcamas	*FACU
Graminoids		
Agropyron cristatum desertorum	Crested wheatgrass	UPL
Agropyron dasystachyum	Thickspike wheatgrass	UPL
Agropyron spicatum	Bluebunch wheatgrass	UPL
Agropyron smithii	Western wheatgrass	FACU
Agropyron trachycaulum	Slender wheatgrass	FAC
Agrostis stolonifera	Redtop	FAC*
Aristida purpurea	Purple three-awn	UPL
Bromus japonicus	Japanese brome	UPL
Bromus tectorum	Cheatgrass	UPL
Carex filifolia	Threadleaf sedge	UPL
Carex interior	Inland sedge	FACW-
Carex nebrascensis	Nebraska sedge	OBL
Carex praegracilis	Clustered field sedge	FACW
Deschampsia cespitosa	Tufted hairgrass	FACW
Distichlis spicata	Saltgrass	FAC+
Eleocharis palustris	Creeping spikerush	OBL
Elymus canadensis	Canada wildrye	FAC
Elymus cinereus	Basin wildrye	FAC
Elymus junceus	Russian wildrye	FAC
Elymus salina	Salina wildrye	*FACU
Festuca idahoensis	Idaho fescue	FACU*
Festuca octoflora	Six-week's fescue	NI
Hilaria jamesii	Galleta	UPL

Appendix B-2. Indicator Status of Vegetation Species in the GWA II Analysis Area, Continued.

SPECIES		INDICATOR STATUS[1]
Scientific Name	Common Name	
Trees/Shrubs		
Hordeum jubatum	Foxtail barley	FAC
Hordeum vulgare	Common barley	UPL
Juncus balticus	Baltic rush	FACW+
Koeleria macrantha	Junegrass	UPL
Leucopoa kingii	Spike fescue	UPL
Muhlenbergia asperifolia	Alkali muhly	FACW
Muhlenbergia filiformis	Pullup muhly	FACW-
Muhlenbergia richardsonis	Mat muhly	FAC+
Oryzopsis contracta	Contracted ricegrass	UPL
Oryzopsis hymenoides	Indian ricegrass	UPL
Phragmites australis	Common reed	FACW+
Poa canbyi	Canby bluegrass	UPL
Poa fendleriana	Mutton bluegrass	UPL
Poa juncifolia	Alkali bluegrass	FACU+
Poa pratensis	Kentucky bluegrass	FAC
Poa secunda secunda	Sandberg bluegrass	UPL
Puccinellia nuttalliana	Nuttall's alkaligrass	FACW+
Scirpus acutus	Hardstem bulrush	OBL
Scirpus spp.	Bulrush	OBL
Sitanion hystrix	Bottlebrush squirreltail	UPL
Spartina gracilis	Alkali cordgrass	FACW
Sporobolus airoides	Alkali sacaton	FAC*
Sporobolus cryptandrus	Sand dropseed	FACU-
Stipa comata	Needle-and-thread	UPL
Stipa lettermani	Letterman needlegrass	UPL
Stipa pinetorum	Pinewoods needlegrass	UPL

1 - MDS = mixed desert shrub
2 - This plant is a succulent rather than a shrub.

APPENDIX C:

PERSONAL AND WRITTEN COMMUNICATIONS

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

December 27, 1993

FILE COPY

Mary Neighbours
Information Manager
Wyoming Natural Diversity Database
1604 Grand Ave., Suite 2
Laramie, WY 82070

Dear Ms. Neighbours:

Union Pacific Resources Company and other operators propose to drill additional gas development wells within the Greater Wamsutter Area located in Carbon and Sweetwater counties, Wyoming, on land managed by the Bureau of Land Management, Great Divide Resource Area. The area of concern occurs in Townships 16, 17, 18, 19, 20, 21, and 22 North and Ranges 92, 93, 94, and 95 West. The enclosed exhibit shows the boundaries of the analysis area.

ECOTONE is aware that contracted ricegrass (*Oryzopsis contracta*), a Category 2 plant, was collected on Delaney Rim within the analysis area (pers. communication dated 7 April 1993 between Holsan Environmental Planning and the Great Divide Resource Area), and that four additional sensitive species were included on a database search performed in 1992: broad-flowered pincushion (*Chaenactis stevioides*), Wyoming tansymustard (*Descurainia torulosa*), Gibbens penstemon (*Penstemon gibbensii*), and western hop-sage (*Zuckia brandegei*).

As part of the baseline data for the environmental impact statement being prepared for the proposed project, ECOTONE is requesting an updated search of the database for threatened, endangered, and candidate species (both plants and animals) as well as for state (FS and BLM) and Heritage Program sensitive species. In addition, any information you can provide on habitat characteristics (including associated species, elevation, soil texture, aspect, slope, etc.) for such species would be greatly appreciated.

If you have any questions regarding this information request, please do not hesitate to call.

Sincerely,

Juli Elayne Crane
Environmental Analyst

Enclosure: Exhibit depicting the analysis area boundary (highlighted)

recycled paper

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

FILE COPY

December 27, 1993

Field Supervisor
U.S. Fish and Wildlife Service
2617 E. Lincoln Way, Suite A
Cheyenne, WY 82001

Dear Madam/Sir:

Union Pacific Resources Company and other operators propose to drill additional gas development wells within the Greater Wamsutter Area located in Carbon and Sweetwater counties, Wyoming, on land managed by the Bureau of Land Management, Great Divide Resource Area. The area of concern occurs in Townships 16, 17, 18, 19, 20, 21, and 22 North and Ranges 92, 93, 94, and 95 West. The enclosed exhibit shows the boundaries of the analysis area.

As part of the baseline data for the environmental impact statement being prepared for this project, ECOTONE is requesting a current list of threatened, endangered, and candidate species (both plants and animals) and their potential habitat for the area of concern. We are aware that contracted ricegrass (*Oryzopsis contracta*, Category 2) was collected on Delaney Rim within the analysis area (pers. communication dated 7 April 1993 between Holsan Environmental Planning and the Great Divide Resource Area).

In addition, any information you can provide on habitat characteristics (including associated species, elevation, soil texture, aspect, slope, etc.) for such species would be greatly appreciated.

If you have any questions, please do not hesitate to call.

Sincerely,

Juli Elayne Crane
Environmental Analyst

Enclosure: Exhibit depicting the analysis area boundary (highlighted)

recycled paper

The Nature Conservancy
Wyoming Natural Diversity Data Base
3165 University Station • Laramie, Wyoming 82071 • (307) 766-3441
1604 Grand Ave., Laramie, WY 82070 (307) 745-5026

January 14, 1994

Juli Elayne Crane
Ecotone Environmental Consulting, Inc.
P.O. Box 3516
Logan, UT 84321

Dear Ms. Crane,

Enclosed are the results of the search that you requested in Sweetwater and Carbon Counties, T16-23N R91-96W. When I added the buffer townships, the search extended into Carbon County; I also wanted to add a bit more area when I updated the search to see if there were possibly more species occurrence information. I have divided the search into plants and animals, and within each division the occurrences are organized by township and range so that all taxa that occur in the same township are grouped together.

Our regular procedure is to include a one-township buffer around your target township. We do this for two reasons: 1. Both plant and animal populations are mobile, and occurrences in neighboring areas may have moved into your target area; 2. This area of Wyoming has not been recently surveyed for all T/E species that may occur, as you will note from some of the dates (Last Observed) on the enclosed records. A database search such as this will indicate what species may occur in the area, but it is not a substitute for a species survey. Adequate pre-project TES screening requires site surveys with collecting visits scheduled throughout the growing season for plants and throughout the year for animals.

In fact, this area of Wyoming has not been surveyed in the recent past. This is reflected in this search update, since the records appear to be much the same as the ones that you mention in your letter.

Of the animals on the list, the Black-footed ferret has high priority status, Listed Endangered. However, these occurrences are historical in nature. The other animals on the list do not have Federal status, but we designate them sensitive in the state. In addition, the Wyoming Game and Fish Department lists Burrowing owl and Dwarf shrew as Priority II, species which need additional study tow determine whether intensive management is required for continuing survival. In effect, it would be a good idea not to build on top of an owl burrow and so on. Finally, the Office of Migratory Bird Management (US Fish and Wildlife Service) lists the Snowy plover as a species whose numbers are declining. If you have detailed questions, please contact our zoologist, Chris Garber.

There are no new plant occurrences on the list, as far as I can see. However, I do have some new information on Oryzopsis contracta. Although it is still listed as a C2 candidate for Federal listing, botanists and managers have found that it seems to be much more widespread than originally thought. Our botanist, Walt Fertig, will be working this summer to document numbers and distribution of the Contracted rice grass in order to recommend downlisting to 3C. Again, there is little known about the other plants on the list, since the area has not been recently surveyed.

The information in this report has been provided for your use, and the person or organization with whom you have contracted for the study. We hope that you will honor our request not to disseminate the information further, and to direct outside inquiries about this information back to our program.

If you have any questions about the search, please be sure and contact me.

Sincerely,

Mary Neighbours

Mary L. Neighbours
Information Manager

WYOMING NATURAL DIVERSITY DATABASE
The Nature Conservancy
January 14, 1994

Elements of Concern in T16-23N R91-96W,
Sweetwater and Carbon Counties
Database Search for Juli Elayne Crane,
Ecotone Environmental Consulting, Inc.

Animals

Occurrence Record for: CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
Occurence Code: ABNNB03030.001 *WY Identification verified: ?
Federal Status: Nature Conservancy Global Rank: G4?
WYNDD State Rank: S1BS3N Management Status: S-USFS R2
L(82)-OMBM
Location: USGS 7.5'Quad: PEACH ORCHARD FLAT Elevation: 6955 ft.
Township: 016N091W Sec. 10
Habitat: SNOWY PLOVER; WYGF-WOS RECORD, OBS #013899; 1 AD AND 2 JUV OBS; HABITAT TYPE 07.00-GRASSLAND.
Last Observed: 1979-08-03 Best Source: WYGF- WOS
End of Record: ABNNB03030 001 * WY

Occurrence Record for: ATHENE CUNICULARIA
BURROWING OWL
Occurence Code: ABNSB10010.035 *WY Identification verified: Y
Federal Status: Nature Conservancy Global Rank: G5
WYNDD State Rank: S2S3BSZN Management Status: S-USFS R2
II-WYGF
Location: USGS 7.5'Quad: BLUE GAP Elevation: 6800 ft.
Township: 016N091W Sec. 15
Habitat: ACTIVE NEST LOCATED IN PRAIRIE DOG HOLE IN SAGEBRUSH- GRASSLAND
Last Observed: 1979-07 Best Source: OAKLEAF, ROBERT PERS COMM
End of Record: ABNSB10010 035 * WY

Occurrence Record for: SOREX NANUS
DWARF SHREW
Occurence Code: AMABA01130.007 *WY Identification verified: ?
Federal Status: Nature Conservancy Global Rank: G5
WYNDD State Rank: S2 Management Status: S-USFS R2
II-WYGF
Location: USGS 7.5'Quad: HAYSTACK FLATS Elevation: 7000 ft.
Township: 017N095W Sec. 19
Habitat:
Last Observed: 1980-08 Best Source: BELITSKY, DAVID LIT
End of Record: AMABA01130 007 * WY

Occurrence Record for: MUSTELA NIGRIPES
BLACK-FOOTED FERRET
Occurence Code: AMAJF02040.028 *WY Identification verified: ?
Federal Status: LE Nature Conservancy Global Rank: G1
WYNDD State Rank: S1 Management Status: I-WYGF
Location: USGS 7.5'Quad: EIGHTMILE LAKE Elevation: 6800 ft.
Township: 018N093W Sec. 21
Habitat:
Last Observed: 1969-00 Best Source: BELCHER, FRITZ IN CLARK 1978 POSITIVE LIT
End of Record: AMAJF02040 028 * WY

Occurrence Record for: MUSTELA NIGRIPES
BLACK-FOOTED FERRET
Occurence Code: AMAJF02040.049 *WY Identification verified: ?
Federal Status: LE Nature Conservancy Global Rank: G1
WYNDD State Rank: S1 Management Status: I-WYGF
Location: USGS 7.5'Quad: EIGHTMILE LAKE Elevation: 6700 ft.
Township: 018N093W Sec. 18
Habitat:
Last Observed: 1963-00 Best Source: MURPHY, R. J. IN CLARK 1978 POSITIVE LIT
End of Record: AMAJF02040 049 * WY

Occurrence Record for: MUSTELA NIGRIPES
BLACK-FOOTED FERRET
Occurence Code: AMAJF02040.077 *WY Identification verified: Y
Federal Status: LE Nature Conservancy Global Rank: G1
WYNDD State Rank: S1 Management Status: I-WYGF
Location: USGS 7.5'Quad: RED DESERT SW Elevation: 7200 ft.
Township: 019N096W Sec. 34
Habitat: DR. M. MAY REPORTED 2 YOUNG.
Last Observed: 1972-07 Best Source: CLARK, TIM LIT
End of Record: AMAJF02040 077 * WY

Occurrence Record for: ATHENE CUNICULARIA
BURROWING OWL
Occurence Code: ABNSB10010.021 *WY Identification verified: Y
Federal Status: Nature Conservancy Global Rank: G5
WYNDD State Rank: S2S3BSZN Management Status: S-USFS R2
II-WYGF
Location: USGS 7.5'Quad: RUBY KNOLLS Elevation: 6900 ft.
Township: 021N092W Sec. 08
Habitat: 2 ADULTS IN SAGEBRUSH GRASSLAND
Last Observed: 1979-07 Best Source: WY GAME AND FISH MKIV06 REPOR PERS COMM
End of Record: ABNSB10010 021 * WY

Occurrence Record for: MUSTELA NIGRIPES
BLACK-FOOTED FERRET
Occurence Code: AMAJF02040.096 *WY Identification verified: Y
Federal Status: LE Nature Conservancy Global Rank: G1
WYNDD State Rank: S1 Management Status: I-WYGF
Location: USGS 7.5'Quad: MONUMENT LAKE Elevation: 6700 ft.
Township: 022N093W Sec. 33
Habitat: SKULL; FOUND IN WHITE-TAILED PRAIRIE DOG TOWN. LOOKED OLD, HALF BURIED, CANINES MISSING. IN FT. COLLINS USFWS COLLECTION-RESEARCH.
Last Observed: 1981-08 Best Source: MARTIN, STEPHEN PERS COMM
End of Record: AMAJF02040 096 * WY

Occurrence Record for: CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
Occurence Code: ABNNB03030.004 *WY Identification verified: ?
Federal Status: Nature Conservancy Global Rank: G4?
WYNDD State Rank: S1BS3N Management Status: S-USFS R
L(82)-OMBM
Location: USGS 7.5'Quad: LOST CREEK BUTTE Elevation: 6479 ft.
Township: 023N094W Sec. 05
Habitat: SNOWY PLOVER; WYGF-WOS RECORD, OBS #005272; 1 AD OBS; NOTE: OBS #005391 HAS SAME DATE, PROBABLY SAME BIRD, HABITAT TYPE-12.70- SHORELINE; S35 SAME TOWNRANGE (NEXT SECTION N).
Last Observed: 1982-07-18 Best Source: WYGF-WOS
End of Record: ABNNB03030 004 * WY

Plants

Occurrence Record for: CHAENACTIS STEVIOIDES
BROAD-FLOWERED PINCUSHION
Occurence Code: PDAST200G0 001 * WY
Federal Status: Nature Conservancy Global Rank: G3?
WYNDD State Rank: S1 State Plant List: WYLST2 Management Status:
Location: USGS 7.5'Quad: BLUE GAP Elevation: 6000 ft.
Township: 016N092W Sec. 16
Habitat: SANDY AREA
Last Observed: 1977-06 Best Source: DORN, R.D.
End of Record: PDAST200G0 001 * WY

Occurrence Record for: CHAENACTIS STEVIOIDES
BROAD-FLOWERED PINCUSHION
Occurence Code: PDAST200G0 002 * WY
Federal Status: Nature Conservancy Global Rank: G3?
WYNDD State Rank: S1 State Plant List: WYLST2 Management Status:
Location: USGS 7.5'Quad: DUCK LAKE Elevation: 6800 ft.
Township: 016N092W Sec. 04
Habitat: SARCOBATUS AND GRAYIA COMMUNITY
Last Observed: 1977-06 Best Source: DORN, R.D.
End of Record: PDAST200G0 002 * WY

Occurrence Record for: ZUCKIA BRANDEGEI
WESTERN HOP-SAGE
Occurence Code: PDCHE0R010 001 * WY
Federal Status: Nature Conservancy Global Rank: G4
WYNDD State Rank: S2 State Plant List: WYLST3 Management Status:
Location: USGS 7.5'Quad: BARREL SPRINGS Elevation: 6800 ft.
Township: 017N095W Sec. 24
Habitat: SILT LOAM SOILS IN SAGEBRUSH-GREASEWOOD DRAWS ON CRUMBLING SHALE OUTCROPS
Last Observed: 1978-08 Best Source:
End of Record: PDCHE0R010 001 * WY

Occurrence Record for: ZUCKIA BRANDEGEI
WESTERN HOP-SAGE
Occurence Code: PDCHE0R010 002 * WY
Federal Status: Nature Conservancy Global Rank: G4
WYNDD State Rank: S2 State Plant List: WYLST3 Management Status:
Location: USGS 7.5'Quad: HAYSTACK FLATS Elevation: 7200 ft.
Township: 017N096W Sec. 26
Habitat: GROWING IN CLAY SOILS ON N FACING SLOPE WITH HIGH BLUFFS
Last Observed: 1978-08 Best Source:
End of Record: PDCHE0R010 002 * WY

Occurrence Record for: PHACELIA TETRAMERA
A TINY PHACELIA
Occurence Code: PDHYD0C4K0 001 * WY
Federal Status: Nature Conservancy Global Rank: G4
WYNDD State Rank: S1 State Plant List: WYLST2 Management Status:
Location: USGS 7.5'Quad: HAYSTACK FLATS Elevation: 7200 ft.
Township: 017N096W Sec. 28
Habitat: BENEATH & AROUND ARTEMISIA TRIDENTATA AT BASE OF E SIDE OF SAND DUNE ABOVE SMALL DRAINAGE, ON SMALL PATCHES OF DAMP SOIL
Last Observed: 1983-06-24 Best Source: DUEHOLM, K.
End of Record: PDHYD0C4K0 001 * WY

Occurrence Record for: ORYZOPSIS CONTRACTA
CONTRACTED INDIAN RICEGRASS
Occurence Code: PMPOA4J051 037 * WY
Federal Status: C2 Nature Conservancy Global Rank: G4T2
WYNDD State Rank: S2 State Plant List: WYLST1 Management Status: RWL-BLM PRRA
Location: USGS 7.5'Quad: TIPTON Elevation: 6600 ft.
Township: 019N096W Sec.
Habitat: ARTEMISIA/ATRIPLEX/OPUNTIA COMMUNITY
Last Observed: 1965-07-14 Best Source:
End of Record: PMPOA4J051 037 * WY

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Ecological Services
4000 Morrie Avenue
Cheyenne, WY 82001

IN REPLY REFER TO:

ES-61411
mej/W.02(UPdrill.spl)

January 18, 1994

Ms. Juli Elayne Crane
ECOTONE Environmental Consulting, Inc.
123 East 200 North
P.O. Box 3516
Logan, UT 84321

RECEIVED
JAN 24 1993

Dear Ms. Crane:

This responds to your letter of December 27, 1993, received by this office on December 30, 1993, regarding the Union Pacific Resources Company proposal to drill additional gas development wells within the Greater Wamsutter Area in Carbon and Sweetwater Counties, Wyoming. We are providing the species list, as requested. We also have concerns with the following issues and request that they receive full treatment in the analysis of this project.

1. Wetland Impacts: We are concerned that wetlands may be impacted by the proposed project. In meeting its responsibilities for wetland protection and conservation, the Bureau of Land Management (BLM) must assure that proposed activities do not result in the taking of any Federal trust wildlife resources nor lead to the contamination of other water sources. Thus, we recommend measures be taken to avoid or mitigate any wetland losses in accordance with Section 404 of the Clean Water Act, the Fish and Wildlife Coordination Act, Executive Order 11990 (wetland protection) and Executive Order 11988 (floodplain management) as well as the President's goal of "no net loss of wetlands." If wetlands may be impacted by the proposed action, those (wetlands) in the project area should be inventoried and fully described in terms of functions and values. Acreage of wetlands, by type, should be disclosed and specific actions outlined to avoid, minimize, and compensate for unavoidable wetland impacts.

The U.S. Fish and Wildlife Service (Service) recommends that you request assistance from the U.S. Army Corps of Engineers (Corps) to determine whether a Section 404 Clean Water Act permit will be required for the proposed work. Under Section 404 (b) (1) guidelines of the Clean Water Act, the analysis should describe alternative actions which avoid, minimize, and compensate for unavoidable wetland impacts. The Service will participate in review of any application for a Section 404 permit. We advise early consultation with the Service and

other appropriate agencies on wetland matters. If wetlands are involved but the Corps determines that an individual permit is not required, the BLM should ensure that the intent of Section 404 of the Clean Water Act is met. Wetland issues should be disclosed and addressed in the analysis even if a Section 404 permit is not required.

2. Endangered Species: In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA), we have determined that the following threatened or endangered (T/E) species may be present in the project area.

SPECIES	STATUS	EXPECTED OCCURRENCE
Black-footed ferret (Mustela nigripes)	Endangered	Potential resident in prairie dog (Cynomys sp.) colonies.
Bald eagle (Haliaeetus leucocephalus)	Endangered	Migrant
Peregrine falcon (Falco peregrinus)	Endangered	Migrant.
Whooping crane (Grus americana)	Endangered	Migrant.

Although most of the project area lies within the Great Divide Basin drainage, part of the project area appears to fall outside of that area. If your proposed action will lead to water quality degradation or water depletion (consumption) in the Colorado River System, you should include the following species in your evaluation:

Colorado squawfish (Ptychocheilus lucius)	Endangered	Downstream resident of Green River System.
Humpback chub (Gila cypha)	Endangered	"
Bonytail Chub (Gila elegans)	Endangered	"
Razorback sucker (Xyrauchen texanus)	Endangered	"

Candidate species that may occur within the project area are identified below. A list providing more information about Wyoming's candidate species is also enclosed. Many Federal agencies have policies to protect candidate species from further population declines. Our office would appreciate receiving any information available on the status of these species in or near the project area.

SPECIES	CATEGORY*	SCIENTIFIC NAME	EXPECTED OCCURRENCE
Birds			
White-faced ibis	2	Plegadis chihi	wetlands statewide
Ferruginous hawk	2	Buteo regalis	grasslands statewide
Columbian sharp-tailed grouse	2	Tympanuchus phasianellus columbianus	Baggs area, Little Snake R.

Mountain plover	1	Charadrius montanus	grasslands statewide
Long-billed curlew	3C	Numenius americanus	grasslands/wetlands
Black tern	2	Chlidonias niger	wetlands statewide
Loggerhead shrike	2	Lanius ludovicianus	woodlands/shrublands
Fish			
Colorado cutthroat trout	2	Salmo clarki pleuriticus	Little Snake R.
Flannelmouth sucker	2	Catostomus latipinnis	Green & Little Snake Rivers & tribs.
Roundtail chub	2	Gila robusta	Green & Little Snake River drges.
Plants			
Contracted Indian ricegrass	2	Oryzopis contracta	plains & hills of western 3/4 of state

*1 = Federal T/E listing appears appropriate and is anticipated. 2 = Current data insufficient to support listing. 3C = More widespread or abundant than previously believed, or no immediate threats identified.

3. Raptor-Proofing Additions or Improvements to Facilities: Two primary causes of raptor deaths are electrocutions and collisions with power lines. If any part of this project will involve construction of new power lines or modification of existing lines, the Service urges ECOTONE to address in the Environmental Impact Statement (EIS) what precautionary measures will be taken to protect raptors through proper raptor-proofing techniques. Federal Register 49 Section 1729.10, 1984, allows for deviations from REA construction standards for raptor protection. Structures which are designed for raptor protection shall be in accordance with Suggested Practices For Raptor Protection on Power Lines. The State of the Art. Raptor Research Report No. 4, 1981, published by the Raptor Research Foundation, Inc. (also cited in FR 11620, 1984), provided that such structures meet with the National Electrical Safety Code. Authority for these measures resides with Section 9 of the Endangered Species Act of 1973 (as amended), The Migratory Bird Treaty Act and the Bald Eagle Protection Act which protects bald and golden eagles. In the above cited Federal Register publication, the following bulletins are also recommended: REA Bulletin 40-7, National Electrical Safety Code-ANSI C2, 1981 Edition and REA Bulletin 61-60, Powerline Contacts by Eagles and Other Large Birds.

4. Water Quality/Habitat Quality: The Service is concerned with water quality impacts of the proposed project, particularly with respect to their effects on fisheries, migratory birds, and Federally listed threatened or endangered species. The EIS should describe project activities that may affect water quality or that have the potential to expose fish and wildlife to hazardous substances. Such activities may include, but are not limited to: wastewater discharges, transportation of hazardous materials, spills, and evaporation ponds.

Section 7(c) of ESA requires that Federal agencies proposing major construction actions complete a biological assessment to determine the effects of the proposed actions on listed and proposed species. If a biological assessment is not required (i.e., all other actions), the

agency is responsible for review of proposed activities to determine whether listed species will be affected. We would appreciate the opportunity to review your determination document.

For those actions where a biological assessment is necessary, it should be completed within 180 days of initiation, but can be extended by mutual agreement between the action agency and the Service. If the assessment is not initiated within 90 days, the list of T/E species should be verified with the Service prior to initiation of the assessment. The biological assessment may be undertaken as part of the agency's compliance of Section 102 of the National Environmental Policy Act (NEPA), and incorporated into the NEPA documents. We recommend that biological assessments include:

1. a description of the project;
2. a description of the specific area potentially affected by the action;
3. the current status, habitat use, and behavior of T/E species in the project area;
4. discussion of the methods used to determine the information in item 3;
5. direct and indirect impacts of the project to T/E species;
6. an analysis of the effects of the action on listed and proposed species and their habitats including cumulative impacts from Federal, State, or private projects in the area;
7. coordination measures that will reduce/eliminate adverse impacts to T/E species;
8. the expected status of T/E species in the future (short and long term) during and after project completion;
9. determination of "is likely to adversely affect" or "is not likely to adversely affect" for listed species;
10. determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species;
11. an analysis of the effects of the action on raptors and coordination measures that will reduce/eliminate adverse impacts to raptors;
12. an analysis of direct and indirect impacts to water quality and coordination measures that will reduce/eliminate adverse impacts to water quality;
13. citation of literature and personal contacts used in assessment.

If it is determined that any agency program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with us. If it is concluded that the project "is not likely to adversely affect" listed species, we should be asked to review the assessment and concur with the determination of no adverse effect.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for Section 7 compliance remains with the Federal agency, and written notice should be provided to the Service upon such a designation. We recommend that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species. Section 7(d) of ESA requires that the Federal agency and permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the

formulation of reasonable and prudent alternatives until consultation on listed species is completed.

We look forward to reviewing the EIS. If you have any questions or need more information please contact Mary Jennings of my staff at the letterhead address or phone (307) 772-2374.

Sincerely,

Charles P. Davis
State Supervisor
Wyoming State Office

enclosure

cc: Director, WGFD, Cheyenne, WY
Nongame Coordinator, WGFD, Lander, WY

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

FILE COPY

February 23, 1994

Mary Read
Wildlife Liaison
Rawlins District
Bureau of Land Management
P.O. Box 670
Rawlins, WY 82301

Ms. Read:

As you know, Gary Holsan Environmental Planning is preparing the EIS for the Greater Wamsutter natural gas project. Mr. Holsan is contracting ECOTONE's services for soils, reclamation, water resources, vegetation, plant species of concern, and wetlands. This letter is a request for BLM confirmation and concurrence on the list of sensitive plant species to be addressed in the EIS. Please indicate if the enclosed table is complete and accurate for the species the Rawlins District wishes to have included.

As you may note, two species previously included in the project EA (July 1992) have been dropped based on updated lists (January 1994) provided by the Fish and Wildlife Service and the Wyoming Natural Diversity Database. The two deleted species were Wyoming tansymustard (*Descurainia torulosa*) and Gibbens penstemon (*Penstemon gibbensii*).

Based on a brief conversation with Connie Breckenridge, Wildlife Biologist, on 30 December 1993, it is our understanding that no formal plant surveys have been performed within the district. Ms. Breckenridge anticipated that contracted ricegrass was the only plant of concern. She expected that it would occur within the project analysis area (indicated on the second enclosure). As such, it appears that contracted ricegrass is the only species to be surveyed for this project. Please indicate if this is accurate.

Also, please provide us with information on any Areas of Critical Environmental Concern (ACEC) that may occur within the project area. Is Delaney Rim considered an ACEC?

I greatly appreciate your assistance.

Sincerely,

Juli Elayne Crane

Juli Elayne Crane
Botanist

Enclosures:

(1) Plant Species of Concern, Status, and Habitat Characteristics
(2) Exhibit of Greater Wamsutter analysis area for the EIS (highlighted boundary)

recycled paper

Ecotone Environmental Consulting

TELEPHONE COMMUNICATION RECORD

Date: 2/24/94 **Time:** 9:18A **Telephone Number:** 307-324-6584 **They Called:** ___

Name: Larry Justesen, Supervisor **Project:** GWAII EIS **You Called:** X

Organization: Carbon Co. Weed & Pest District

Subject: All Wyoming has same State list of noxious weeds. 20 designated noxious weeds. Not all designated weeds occur in every county. Each year County Weed & Pest Board can specify up to 2 different species in addition to the State list. For Carbon County, the 2 additional pest species are mosquitos and larkspur (this added year). These species (and state noxious species) are the official list of weeds & pests the county can assist with funding (1/2 funding) for a landowner to eradicate/control.

Name of counterpart in Sweetwater Co. is Ralf Simnacher (pronounced SIM-NOKKER), Supervisor. He's located in Farson, Wy. # is 307-273-9683

Ecotone Environmental Consulting

TELEPHONE COMMUNICATION RECORD

Date: 2/24/94 **Time:** 9:27a **Telephone Number:** 307-273-9683 **They Called:** ___

Name: Ralph Simnacher, Supervisor **Project:** GWA II EIS **You Called:** X

Organization: Sweetwater Co. Weed & Pest District

Subject: In addition to the 20 designated state noxious weeds, Sweetwater County includes pest species of mosquitos and foxtail barley for control funding assistance. These two additional species have been the same for the past 10 years.

Carbon County Weed & Pest

P.O. Box 1126 - 1301 Bonanza
Rawlins, Wyoming 82301

Larry Justesen
Supervisor

Bus. Phone
(307) 324-6584

4/94

Juli;

Here is the "Designated list".
The weeds marked over in blue
may be found in the Wamsutter
area as well as "Halogeton"; which is toxic to Livestock. "just another weed" that is not here on a dose or annual basis

the weed Handbook may be helpful.

note: the description of the weed is on the back of the picture not on the opposite page.

If I can be of further help
Please let me Know.

Larry

W.S. 11-5-102 (a)

(x) "Designated list" means the list of weeds and pests from time to time designated by joint resolution of the board and the Wyo. Weed and Pest Council:

(xi) Designated Noxious Weeds:

1. Field Bindweed (Convolvulus Arvensis)
2. Canada Thistle (Circium Arvense)
3. Leafy Spurge (Euphorbia Esula)
4. Perennial Sowthistle (Sonchus Arvensis)
5. Quackgrass (Agropyron repens)
6. Hoary Cress (Whitetop) (Cardaria Draba and Cardaria Pubsescens)
7. Perennial Pepperweed (Giant Whitetop) (Lepidium Latifolium)
8. Ox-eye Daisy (Chrysanthemum Leucanthemum)
9. Skeletonleaf Bursage (Franseria Discolor)
10. Russian Knapweed (Centaurea Repens)
11. Yellow Toadflax (Linaria Dalmatica)
12. Dalmation Toadflax (Linaria Vulgaris)
13. Scotch Thistle (Onopordum Acanthium)
14. Musk Thistle (Carduus Nutans)
15. Common Burdock (Arctium Minus)
16. Plumeless Thistle (Carduus Acanthoides)
17. Dyers Woad (Isatis Tinctoria L)
18. Hounds Tongue (Cynoglossum Officinale L)
19. Spotted Knapweed (Centaurea Maculosa Lam.)
20. Diffuse Knapweed (Centaurea Diffusa)

(xii) Designated Pests

1. Grasshoppers
2. Mormon Crickets
3. Prairie Dogs
4. Ground Sqirrels
5. Mountain Pine Beetle
6. Beet Leafhopper

1994 Additional
1. Mosquitos
2. Delphinium gueri

6/23/94
→ can designate other spp that are on list
1) Dalmation - gueri
2) modification
equal concern w/ it in that it's not or designated. Means the county doesn't cost share on spraying of it.
County could declare an emergency situation

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Great Divide Resource Area
812 East Murray
Rawlins, Wyoming 82301-0670

TAKE PRIDE IN AMERICA

6513

April 7, 1993

Gary Holsan
Environmental Planning
P.O. Box 175
Thayne, WY 83127

Dear Gary:

The purpose of this letter is to summarize the conversation you had with Connie Breckenridge, Wildlife Biologist, on April 6, 1993 concerning inventorying for rare plants along the proposed Echo Springs Pipeline Gathering System.

Contracted ricegrass (Oryzopsis contracta), a USFWS category 2 plant, was positively identified by Jeff Carroll, BLM State Botanist, and staff of the Rocky Mountain Herbarium, University of Wyoming, in Laramie. This plant was collected on Delaney Rim just west of the proposed pipeline and within the Greater Wamsutter Analysis Area. BLM policy states that we will treat category species similarly to T&E species in order to prevent the listing of these species.

The following outlines the requirements for a rare plant survey in Great Divide Resource Area:

1. Surveys should be performed by individuals qualified in plant taxonomy and knowledgeable specifically in Wyoming plants. Botanists suggested by The Nature Conservancy (3165 University Station, Laramie WY 82071; 307-766-3441) or the Rocky Mountain Herbarium (University of Wyoming, Box 3254, University Station, Laramie, WY 82071; 307-766-2236) are strongly recommended. Credentials of the individual(s) selected to do the survey should be made available to this office for final approval. Credentials should include a history of work done on rare plants in Wyoming habitats.

2. The survey should include:

   a) The area within the ROW and 20 feet outside both sides of the ROW. Surveys will be done on foot - no horses or mechanized equipment will be allowed;

   b) All habitat types within the survey area should be clearly labeled and delineated on 7.5 minute USGS quad maps;

   c) If any rare plants (USFWS C1, C2 or 3C) are found the soil type, habitat type and associated plants would be listed and the area mapped;

   d) All unknown or unidentified plants encountered during surveys must be noted, identified, and placed in a herbarium mutually agreed to by the BLM and the lessee.

3. A report summarizing the survey should be prepared and submitted to this office. The report should include:

a) The findings of the survey, what was surveyed, and when, how and by whom the survey was done;

b) Copies of all field forms and maps;

c) The exact location of any rare or sensitive plant population, both by legal description and by areas marked on the maps;

d) If a rare or sensitive plant is found during the survey mitigation options would be suggested.

If you have any questions concerning this survey please contact Connie Breckenridge of this office (307-324-4841).

Sincerely,

Area Manager
Great Divide Resource Area

cc: Joy Rector, Regulatory Analyst
Union Pacific Resources Co.
Mail Station 3407
P. O. Box 7
Fort Worth, Texas 76101-0007

Ecotone Environmental Consulting

TELEPHONE COMMUNICATION RECORD

Date: 6/17/94 **Time:** 4:30p **Telephone Number:** 307-324-4841 **They Called:** X

Name: Mary Read 812 E. Murray/Rawlins WY 82301 **Project:** GWA II **You Called:** ___

Organization: BLM – Rawlins Great Divide Resource Area

Subject: Spp. of Special Concern

Has some other plants than the four listed that BLM wants tracked through the NEPA process. The spp. were determined based on her communication w/ WYNDDB personnel, Rocky Mtn. Herbarium, etc. Spp include the following:

On list we sent on 23 Feb 1994 letter to her

1) Oxytropis contiacta – it's supposedly going to be down-graded from C2 to 3C. They are no longer really concerned w/ it as a field inventory spp. but should still be tracked through NEPA & provide reference to the fact that it's been proposed for downgrading due to a greater distribution than previously known (263 sites as opposed to 11)

She would like me to send copy of the photo-copy I got from RM Herbarium that shows the inflorescence is not always contracted.

2) Chaenactis stevioides (Broad-flowered pincushion)

3) Phacelia tetramera

4) Zuckia brandegei

ALSO: 5) Artemisia biennis var. diffusa – possible in area

6) Lesquerella macrocarpa (3C spp) – " " "

OVER

7) Cirsium aridum – newly discovered spp (C2) – possible in area

*8) Descurainia torulosa – Wyoming Tansy mustard (C1)

9) Phlox opalensis — ? likely to occur? She wasn't sure; said she needed to talk w/ Barb Amidon about this spp.

*10) Penstemon gibbensii – C2 spp.

* I indicated that these two spp had not been included on the FWS or WYNDDB request responses & wondered if the status had changed for them. (6/20/94 – called WYNDDB & got confirmation that the status' as indicated are correct.)

[Many did not indicate which plants BLM felt the need for clearance surveys for, but she did indicate that due to its commonness & potential downlisting, Oxytropsis contracta is "no longer really a concern."]

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

FILE COPY

June 22, 1994

Ms. Mary Read
Wildlife Liaison
Rawlins District
Bureau of Land Management
812 East Murray
Rawlins, WY 82301

This letter is to confirm the list of plant species of concern to be administratively tracked through the NEPA process for the Greater Wamsutter Analysis Area environmental impact statement. Based on our telephone conversation on 17 June 1994, there are a total of ten species:

- Broad-flowered pincushion, *Chaenactis stevioides*
- Cedar Rim thistle, *Cirsium aridum* (C2)
- Contracted ricegrass, *Oryzopsis contracta* (currently C2 status but proposed for down-listing to 3C)
- Diffuse sagebrush, *Artemisia biennis* var. *diffusa* (? federal status)
- Gibbens penstemon, *Penstemon gibbensii* (C2)
- Large-fruited bladderpod, *Lesquerella macrocarpa* (C2)
- Opal phlox, *Phlox opalensis* (C2)
- Unnamed phacelia, *Phacelia tetramera*
- Western hop-sage, *Zuckia brandegei*
- Wyoming tansy mustard, *Descurainia torulosa* (C1)

Enclosed, as promised, is a photocopy of a mounted specimen of contracted ricegrass showing the similarity between that and Indian ricegrass. More than half of the mounts I reviewed at the Rocky Mountain Herbarium did not have the contracted panicle indicated in Dorn's flora.

For the above ten species, could you provide me with BLM's in-house information (e.g., Wyoming tansy mustard status report, status reports for any of the other species, habitat management plan information, other clearance surveys performed in the analysis area, etc.) that would cover such aspects as habitat of occurrence, soil type, geologic unit preferred (if any), associated species, flowering period, fruiting period, technical descriptions of each species (beyond those found in Dorn's flora), elevation, slope, aspect, etc. If this is information I should request from Barb Amidon

recycled paper

at the Rock Springs District Office, please call or fax me a message to let me know, and I'll get in touch with her.

If you have questions regarding this request, please do not hesitate to call me or fax me at the above number. Thanks for your assistance!

Sincerely,

Juli Elayne Crane

Juli Elayne Crane
Botanist/Technical Assistant

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

June 22, 1994

Mr. Ronald L. Hartman, Curator
Rocky Mountain Herbarium
Department of Botany
3165 University Station
Laramie, Wyoming 82071

Dear Mr. Hartman:

First off, let me thank you for your assistance during my visit to the herbarium on 14 June 1994. As I mentioned, ECOTONE is preparing vegetation sections of an environmental impact statement for the proposed Greater Wamsutter Analysis Area environmental impact statement.

As of the first of this week, we have received additional species of concern that the Rawlins BLM would like to see tracked through the EIS. I am hoping you can provide me with references for which I can obtain the indicated information on the following species:

Artemisia biennis var. *diffusa*: habitat or community type of preference, elevation, microclimate, elevation of occurrence, soil type, geologic formation preferred--if any, associated species, and a photocopy of a mounted specimen.

Cirsium aridum: associated species and photocopy of a mounted specimen.

Descurainia torulosa: habitat, soil type, elevation, associated species, and photocopy of mounted specimen.

Penstemon gibbensii: elevation and photocopy of a mounted specimen.

Zuckia brandegei: photocopy of mounted specimen

Your assistance would be greatly appreciated. If the cost of providing such information will be greater than $30.00, please call me in advance at the above number. Again, thank you for your help.

Sincerely,

Juli Elayne Crane

Juli Elayne Crane
Botanist/Technical Assistant

recycled paper

Ecotone Environmental Consulting

TELEPHONE COMMUNICATION RECORD

Date: 6/23/94 Time: _____ Telephone Number: 307-324-6584 They Called: ___

Name: Larry Justesen, Supervisor Project: GWATT You Called: X

Organization: Carbon County Wed & Pest District

Subject: • Halogeton, @ least for this year, is "just another weed." In the past it has been 1 of the 2 addl spp. the county can designate as noxious. Such designation allows county to cost-share with land-owners for control/removal.
• Designation of the 2 addl. spp. is done on an annual basis. This year, the 2 addl spp. are Geyer larkspur (Delphinium geyeri) and mosquitos
• There is great concern with halogeton in Carbon Co., but since it's not on the list, the county doesn't cost share spraying for it — unless the County were to declare an "emergency situation."

ECOTONE Environmental Consulting, INC.

123 EAST 200 NORTH, P.O. BOX 3516, LOGAN, UT 84321
BUS 801/752-2204 FAX 801/752-0733

FILE COPY

July 15, 1994

Ms. Mary Read
Wildlife Liaison
Rawlins District
Bureau of Land Management
812 East Murray
Rawlins, WY 82301

Ms. Read:

In our conversation on 17 June 1994, you indicated that contracted ricegrass (*Oryzopsis contracta*) is scheduled to be downgraded from C2 to 3C status and that the Rawlins District will not require field inventories for this species within the Greater Wamsutter Area II prior to surface disturbance activities, should the project be authorized.

I would like to receive confirmation regarding the Rawlins District's policy on site-specific clearance surveys relative to the ten plant species of concern (listed in my 22 June 1994 letter) being administratively tracked through the environmental impact statement. My understanding is that clearance surveys would be required for federally listed threatened (T) and endangered (E) species, species proposed for listing (P), and Category 1 and 2 candidate species. If this is not the District's policy, please advise me so that I may include the appropriate mitigation text in the Draft EIS.

If you have any questions regarding this request, please contact me at the above number(s).

Sincerely,

Juli Elayne Crane

Juli Elayne Crane
Botanist/Technical Assistant

recycled paper

Ecotone Environmental Consulting

TELEPHONE COMMUNICATION RECORD

Date: July 21, 1994 **Time:** 8:04A **Telephone Number:** 307-324-4841 **They Called:** X

Name: Mary Read **Project:** GWAII **You Called:** ___

Organization: Rawlins BLM

Subject: • Letter I sent (7/15/94) stated that Oxytropis contracta, being scheduled for down listing from C2 to 3C, would not require field surveys prior to surface disturbance. She wanted to clarify BLM's position. The plant is still C2 right now. In general, BLM Rawlins is "not overly concerned with 3C species" but probably should include them in any site-specific survey work.

• Summary of decision: In mitigation, EIS should indicate that on-the-ground clearance surveys will be required (prior to surface disturbance) for any potential threatened, endangered, proposed, C1, C2, (AND) 3C spp. indicated on current BLM, WYNDDB, & FWS lists at that time. (ie, the list in the EIS may change - be decreased or added to).

• She confirmed verbally that the 10 spp in the June 22, 1994 letter are the ones they want to see tracked through the EIS. She will write a letter to that effect to provide a paper-trail.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Great Divide Resource Area
812 East Murray
Rawlins, Wyoming 82301-0670

1150 01

December 20, 1995

Juli Elayne Crane
Botanist/Technical Assistant
ECOTONE Environmental Consulting, Inc.
123 East 200 North, P.O. Box 3516
Logan, Utah 84321

Dear Juli:

Attached please find information pertaining to the list of plant species of concern that the BLM Great Divide Resource Area does administratively track through the NEPA process. These particular plants are those that may exist or already have been sited in the Greater Wamsutter II Analysis Area, and therefore must be surveyed for the Greater Wamsutter II EIS. It is the BLM policy to follow the rules and regulations of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) utilizing the Department of the Interior BLM Manual 6840 (Special Status Species Management). The manual requires that surveys be completed for federally listed threatened (T) and endangered (E) species, species proposed for listing (P), and Category 1 and 2 candidate species.

Information on seven (7) of the species that are listed in your June 22, 1994 letter are attached. These species are the:

Cedar Rim thistle (*Cirsium aridum*)
Contracted ricegrass (*Oryzopsis contracta*)
Diffuse sagebrush (*Artemesia biennis* var. *diffusa*)
Gibbens penstemon (*Penstemon gibbensii*)
Large-fruited bladderpod (*Lesquerella macrocarpa*)
Opal phlox (*Phlox opalensis*)
Wyoming tansy mustard (*Descurainia torulosa*)

The information is from the Wyoming Natural Diversity Database, prepared by Walt Fertig in 1994, which you may already have at this time.

In addition, there is limited information on the Esteve's Pincushion, or Broad-flowered pincushion, (*Chaenactis stevioides*) at this time. Attached is some information that Mary Read, BLM Wildlife Biologist, has been able to locate from The Audubon Society Field Guide to North American Wildflowers.

At this time, Mary has been unable to obtain additional information on the Unnamed phacelia (*Phacelia tertramera*) and the Western hop-sage (*Zuckia brandegei*) beyond that found in Dorn's flora. For the above listed three plant species, you may want to discuss them with Walt Fertig; we are unaware that they are a species of special concern at this time. Mary will continue to gather as much information as possible on all ten (10) plant species. You may wish to contact Barb Amidon at the Rock Springs District Office for additional information.

The BLM appreciates the interest in these species and will cooperate as much as possible in gathering more information about these particular plants. Please feel free to contact myself or Mary Read, at the Great Divide Resource Area office at (307) 324-4841, at any time.

Sincerely,

Area Manager
Great Divide Resource Area

2854.

TD
195
.G3
D723
1995c

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225

TR
145
.G3
D723
1995c

Greater Wamsutter Area II Gas Development Project

Map 1 -- Surface Water Features and Wetlands

Symbol Legend:

- Wetland Area > 10 Acres
- Wetland Area < 10 Acres
- Jurisdictional Stream
- Drainages
- Vegetation & Soils Sample Point
- Wetland Sample Point
- Topsoil Sample Point

0 1 2 3 4 5

Scale in Miles

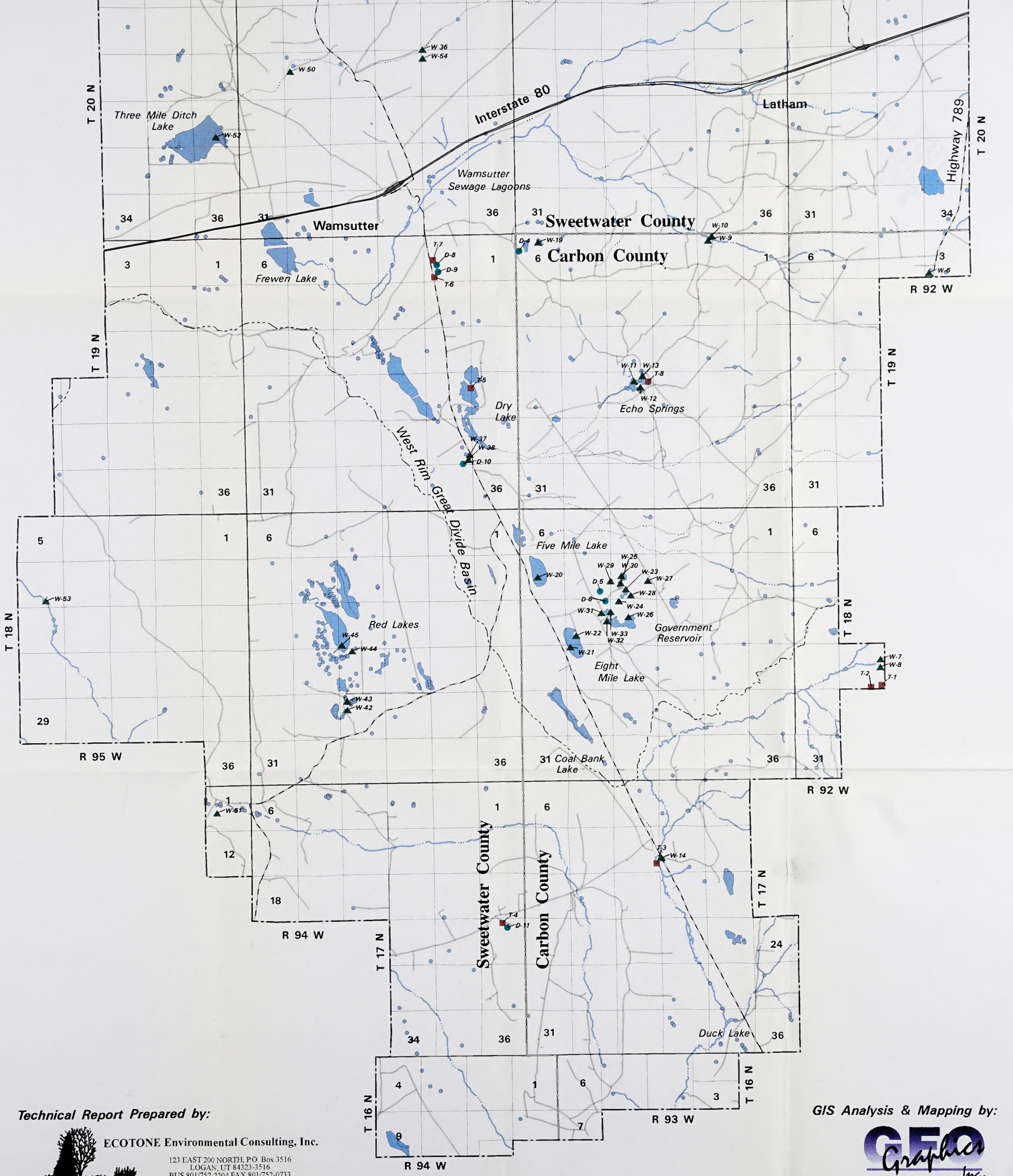
N

R 95 W R 94 W R 93 W R 92 W

T 22 N T 21 N T 20 N T 19 N T 18 N

Monument Lake
Twelvemile Hole
Black Lake
Three Mile Ditch Lake
Wamsutter
Wamsutter Sewage Lagoons
Frewen Lake
Dry Lake
West Rim Great Divide Basin
Five Mile Lake
Red Lakes
Government Reservoir
Echo Springs
Latham
Interstate 80
Highway 789
Sweetwater County
Carbon County

W-46 W-16 W-15 W-47 W-39 W-40 W-41 W-34 D-7 W-35 D-1 W-48 W-49 D-2 D-3 W-17 W-18 W-1 W-2 W-4 W-3 W-5 W-36 W-54 W-50 W-52 W-53 T-7 D-8 D-9 T-6 D-4 W-19 W-10 W-9 W-6 T-5 W-37 W-38 D-10 W-11 W-13 T-8 W-12 W-20 W-25 W-29 W-30 W-23 W-27 D-5 W-28 D-6 W-24 W-31 W-26 W-22 W-33 W-32 W-45 W-44



Technical Report Prepared by:

ECOTONE Environmental Consulting, Inc.

123 EAST 200 NORTH, P.O. Box 3516
LOGAN, UT 84323-3516
BUS 801/752-2204 FAX 801/752-0733

GIS Analysis & Mapping by:

GEO Graphics Inc.

The BLM appreciates the interest in these species and will co
as possible in gathering more information about these partic
Please feel free to contact myself or Mary Read, at the Gr
Area office at (307) 324-4841, at any time.

